Vol. 6, No. 6 JUNE, 1931

The FLEET OWNER

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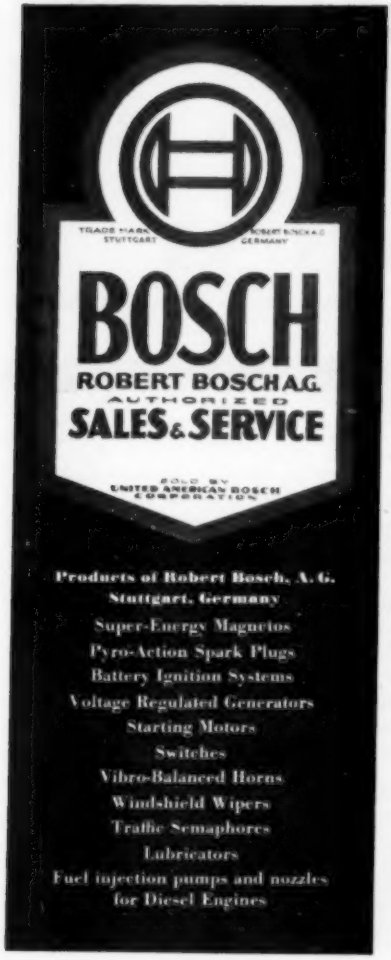

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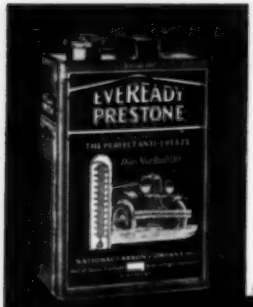

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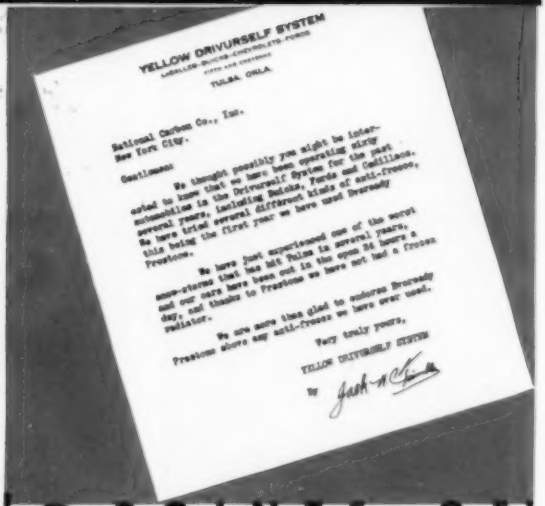
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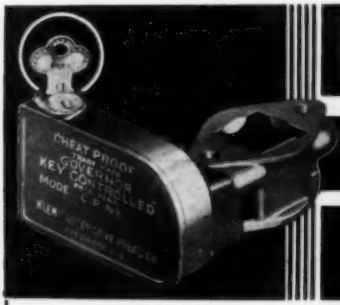

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HENRY CLAY FISCHER
Editor

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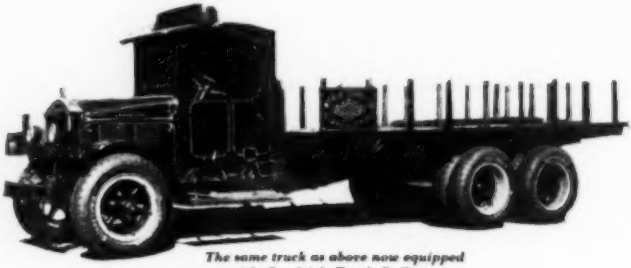
Out of *a simple* CHANGEOVER *comes* NEW TRUCK PERFORMANCE



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The FLEET OWNER

"For Those Who Service Their Own"

PUBLISHED monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops, and devoted to the better operation and maintenance of Trucks, Passenger Cars, Busses and Taxis.

HENRY CLAY FISCHER, Editor

Vol. 6 New York, June, 1931 No. 6

How Many Are There in Your Shop?

THIS has often been called an "age of specialization" by business leaders, automotive authorities and others whose opinions we are inclined to accept with a certain amount of faith. In fact, there are few who will not agree with what might now be called a fact.

Everywhere we look, in the automotive field, at least, we will find "specialists." There is the brake "specialist," the wheel alignment "clinic," the battery and tire "doctor," the cylinder reboring "expert," and so on—each of which is a specialist in his own line of endeavor.

And in our fleet maintenance shops, too, are these specialists to be found. In the article beginning on page 11 of this issue, one of our correspondents brings to your attention at this time the wisdom of employing "specialists" to do certain work on certain units, believing that a mechanic becomes more skillful and better able to turn out a satisfactory job, as his knowledge of those particular units increases.

Of course, if your shop is a small one with a limited personnel, on account of the simple fact that there are only so many vehicles in the fleet, it is not expected that only certain work shall

be allotted to certain men. Should the fleet be composed of one or two exclusive makes of vehicles, it is quite possible that these men can become "specialists" in these particular makes, so that the idea of specilization can still be carried out, but in a different manner than that prescribed in the article.

Where the fleet is small and composed of one or two makes it is quite the economical thing to have a crew of Reo, Dodge or Stewart "specialists" in your shop. Where it is a large and varied fleet, on the other hand, it will pay to train your men so that some of them at least, are brake, tire, axle, transmission and motor specialists. That this is good business practice, every fleet maintenance man will agree.

The Racers Recognize Wheel Alignment

THE Indianapolis 500-mile Race, long a classic for many years and one of the major racing events of the world, is about to take place as this issue is being prepared for the press. Last year, for the first time, all drivers and mechanics had access to a scientific steering service that would assure free, easy handling and safe control, for, through the courtesy of a leading manufacturer, a complete set of wheel alignment equipment has been set up inside the track, for the use of all. This year, probably all of them will have taken advantage of the generous offering of this manufacturer, who contributes in the interests of accuracy and safety.

All of which emphasizes the importance of good steering safety, which consists of a well lubricated and adjusted steering linkage in combination with a properly aligned set of front wheels. Steering safety, however, is not only necessary on the race track. It is equally important to the taxicab fleet, the truck fleet, the bus fleet and in fact any automotive vehicle whether operated in fleets or not. If you have not as yet begun to give wheel alignment the amount of thought it merits, you are losing money by not enjoying the economies of proper operation and maintenance. If you want to start today, the Editor will help you by sending, absolutely free of charge, a comprehensive manual on the subject. Just ask for the book on wheel alignment.

The Editor

Each Man *a Specialist*

Same Mechanics Do All Work on Similar Units, in Maintaining Standard Oil Company's Fleet

By F. Leslie Jacobus

BELIEVING that a mechanic becomes more skillful and better able to turn out a satisfactory job as his knowledge of a specific group of units, such as engines, rear axles or transmissions increases, the motor vehicle department of the Standard Oil Company of New Jersey follows the practice of giving all work on similar units to the same men.

All rear axles, regardless of size or manufacture are overhauled by the same mechanics, the rule applying also to engines, transmissions, steering gears and body work. Two of the advantages to be gained by using this system are that the workers, becoming more skillful, better jobs are turned out in a shorter time, and each mechanic has only the special tools necessary for the particular unit he works on.

The repair shop in Newark is responsible for the maintenance of 450 trucks and service cars and is one of the few organizations of its kind to have an engineering department, a part of whose duty is to design and build special tools and fixtures to speed up maintenance. The development of these maintenance tools is under the supervision of J. F. Winchester, supervisor of motor vehicles.

Vehicles which need repairing are sent to the shop by the field motor vehicle inspectors. The shop inspector gives the truck a general inspection and the units to be overhauled are removed and replaced by spare units from stock.

In the case of transmissions and rear axles to be overhauled, the lubricant is drained and the units are cleaned by being dipped into hot

cleaning solution for about 15 minutes. The cover plates are first removed to allow the solution to clean the interior as well as the exterior. After removal from the cleaning tank, the parts are thoroughly washed with a stream of cold water.

Care is taken to see that the cleaning solution is entirely removed from all pockets and oil grooves directly connected with bearing surfaces, as it has been found that some cleaning materials, if allowed to remain in contact with bearing surfaces for several days, have an acid reaction and tend to etch the highly polished steel shafts and bearings.

The unit is then disassembled and each part carefully washed in kerosene and inspected to see whether it needs to be replaced. It is at this point that the specialized experience of the mechanic is of the greatest value. He is a man who has had at least several years of service and training with the company and knows thoroughly just what is expected and how to accomplish the desired results.

After he has gone over the parts and listed up the replacements, he calls his foreman and they make the final check together, deciding which parts to use again and which parts to replace. In this manner, a first class unit is turned out at minimum cost.

After being cleaned, the gears are examined for pitted or flaked tooth surfaces, cracked teeth or other indications of excessive strain or wear. If properly meshed when first assembled, gears will show the effect of normal wear by gradually becoming noisy due to wear at the pitch diameter. Two gears which have run together for a long time may show noticeable wear and yet run quietly in operation, but if a new gear is substituted and run with one of the old gears, the result will usually be a noisy unit. For this reason if one of a pair of gears is chipped or broken to the point where it needs replacement, both are removed. This is particularly true wth transmissions and rear axles.

"Specialist" testing transmission case for cracks, with hammer.

Anti-friction bearings should re-

Reduce Costs per "Truck Mile"

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ceive most careful attention. Ball and roller bearings are carefully cleaned and blown out by compressed air to make sure that every particle of dirt is removed from the surface. The bearings are then turned by hand and must give no evidence of high spots or uneven rolling surfaces. Any visible pitmarks on the race or rollers is sufficient cause for rejection. Annular, non-adjustable bearings must not show more than noticeable clearance between the rolling elements.

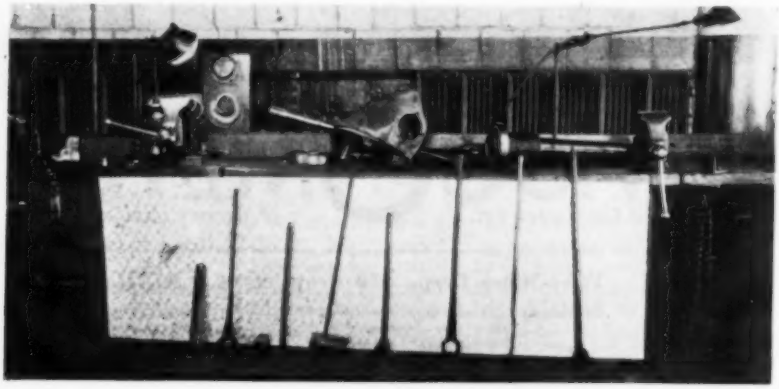
In a transmission, loose-fitting bearings which allow the shafts to have a certain amount of end-play are frequently the cause of the gears jumping out of engagement when in operation. Splined shafts which show wear of over .025 in. should be replaced, to eliminate difficulty ir shifting the gears.

Housings are inspected for cracks and misalignment caused by the gears becoming locked and the supporting elements forced apart. With transmission and rear axle cases, a crack can usually be detected by tapping the case all over with a light hammer. The location of a crack will be indicated by a comparatively dull note when the case is struck with the hammer.

If the crack is small and in a place not subjected to great strain, it is welded and the case used again. If a housing is suspected of being out of alignment, it is tested by means of a long steel straight edge on the various bearing surfaces.

Differential housings occasionally become bent when the power is suddenly applied, due to the tendency of the ring and pinion gear to be forced apart. The assembly is placed in a lathe and the surface to which the ring bolt is bolted, is tested by means of a dial indicator. If it does not run true, a light cut is taken off.

Assembly methods as practiced in this shop are of particular interest. Differentials are assembled on a special work stand which has been designed to give better support to the unit while the mechanic is working on it, as shown in the illustra-



Some of the special tools developed for certain work.

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IS IT ANY WONDER that the Purity Bakeries Inc., Chicago, say: "Lempco Brake Drums in combination with woven brake lining give the best results." And that Gun Alloys are used with their vast fleet of 2257 trucks, when it's realized that Lempco Gun Alloys outlast ordinary drums 3 to 5 times—increase brake lining life 200% to 300%, thus eliminating 75% of all brake adjustments.

One set will prove Gun Alloys cut brake maintenance costs in an amazing fashion—by practically $150—because in outlasting ordinary drums 3 to 5 times they eliminate 3 to 5 brake replacement jobs.

So whether you own only one truck, bus or taxicab, or operate a vast fleet, you save "plenty" by replacing with Gun Alloys. Made for practically every truck, bus and taxicab in operation. Your parts dealer has or can get them overnight.

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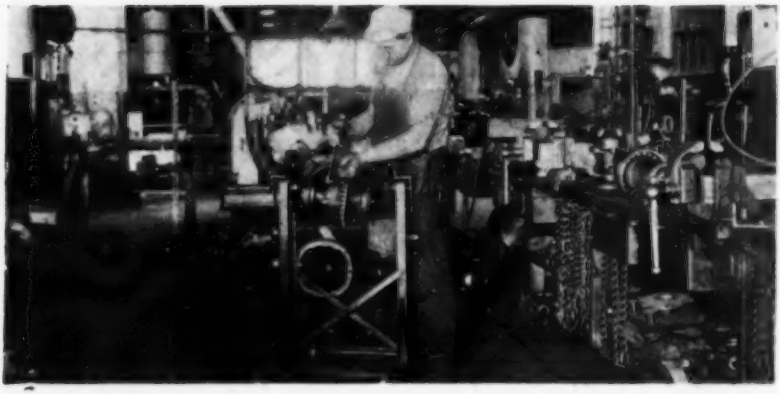

Assembling differential unit on special work-stand.

tion. The work support can be tilted to allow access to either the top or bottom of the differential. The work stands are all of one size. The various differentials are held on special adapter plates.

Practically all types of axles are brought to the shop for repair, including bevel, worm, double reduction and internal gear types. Assembly methods common to all types are outlined herewith:

After all parts have been inspected and the new parts received, the first sub-assembly worked upon is the pinion gear. This unit consists, essentially, of the pinion gear, the shaft, the bearings and the housing. The pinion must be rigidly supported in an axial direction to prevent the pinion from meshing too deeply with the bevel gear and causing noisy operation. For this reason annular bearings must have practically no end-play and taper roller bearings must be closely adjusted.

All bearings of this type are adjusted so that the shaft will turn without any tendency to bind, and will also have no noticeable looseness when turned by hand. The pinion unit is then placed in the housing with the same number of shims as it had when it was disassembled. If adjustment is needed, to give the proper mesh with the ring gear shims can be removed or added as necessary. To get proper adjustments it is necessary to have shims of two, three, five, ten and fifteen thousands of an inch in thickness.

Too much cannot be said regarding the proper meshing of gears. It is important to have the proper gear contact between the pinion and ring gear or the worm and worm wheel. The pinion or worm should have a full face contact extending from the top to the bottom of each tooth. Contact on the toe or heel of the tooth, caused by incorrect adjustment, will result in broken or excessively worn teeth. The contact is determined by applying a thin coat of red lead to the surfaces and turning the assembly

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by hand.

Other gears, such as in transmissions, have non-adjustable centers and the center-to-center adjustment will be satisfactory if the bearings are in good condition. In this case it is important to see that the gears are centered and that they mesh throughout their entire width when properly shifted.

Backlash of about .010 in. is allowed in bevel and spur gearing to prevent damage by occasional high spots. This clearance can be measured by inserting the proper feeler, well greased, between the teeth, and by rolling them into contact by hand.

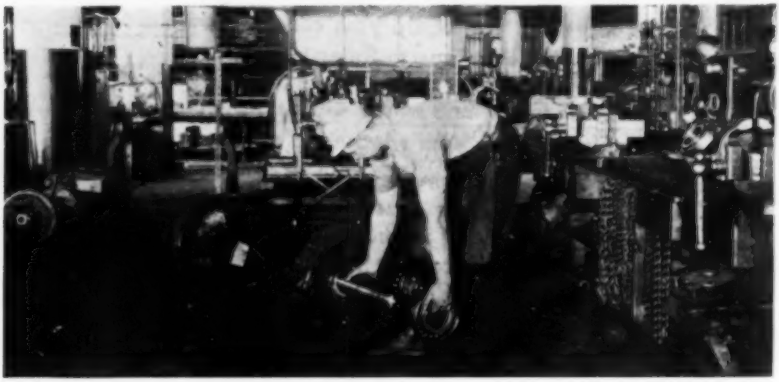
Brake shoes are removed and relined. If the drums are grooved or scored, they are sent to a shop that specializes on brake work and they are bored out and returned. The amount of metal removed in this operation is so little that the standard brake lining can still be used except in cases of extreme wear.

The brake operating levers, shafts and cams are inspected and rebushed if any looseness is apparent. Brake shoe hinge pins must have a snug fit to prevent rattling when the truck is driven over rough road surfaces.

All felt grease washers and all gaskets are renewed whenever units are down. Several special hand tools, illustrated, have been made to facilitate making quick and accurate adjustments of the bearings and gears.

Particular attention is paid to the assembly of transmissions. If the internal and external teeth of the high speed engagement are noticeably worn, the parts are renewed to eliminate the possibility of the transmission jumping out of gear when in operation.

Transmission cases are inspected for cracks and if any occur near bearing supports or indicate weakness, the case is replaced. Minor cracks are occasionally covered inside and out with three or four coats of shellac to prevent grease leaks.



One of the "specialists" inserting a rear axle sleeve.

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Purchasing Agent

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CONTINENTAL MOTORS CORPORATION
***Offices*: Detroit, Michigan, U.S.A. *Factories*: Detroit and Muskegon**

Continental Engines

Building Aluminum *Bodies*

A Non-Technical Treatise on the Fabrication of Aluminum Bodies for Busses and Trucks

IN general, the fabrication of an aluminum alloy body and a steel body are practically the same. There are, however, a few fundamental differences in the characteristics of the two metals, and as a result of these, the construction details naturally will vary to some extent. Then too, it is often advisable to make changes in design in order to eliminate certain steel practices which are not directly applicable to aluminum.

Mechanical Properties: The physical properties of the strong aluminum alloys, commonly employed in the strength members of both trucks and buses, are listed in Table I. The maximum properties in these alloys are obtained only after they have been fully heat-treated and aged. There are, however, other tempers besides the fully heat-treated and aged temper: these are the annealed, the heat-treated, and the heat-treated, fully aged and then cold-worked tempers. Briefly, the heat treating process consists of heating the alloys at 930°-960°F. for a number of hours and then quenching them in cold water; the aging process may be carried out either at room temperatures or at elevated temperatures. Alloy 17S age-hardens at room temperature after heat-treatment and attains its maximum properties in about four days; 25S and 51S alloys must be heated to approximately 300°F. for from 12 to 18 hours after heat-treatment before they have fully age-hardened. The various tempers are designated by letters added to the alloy number: "O" standing for the dead-soft or annealed temper; "W" for the heat-treated temper; "T" for the fully heat-treated and aged temper; and "RT" for the heat-treated, fully aged and then cold worked temper.

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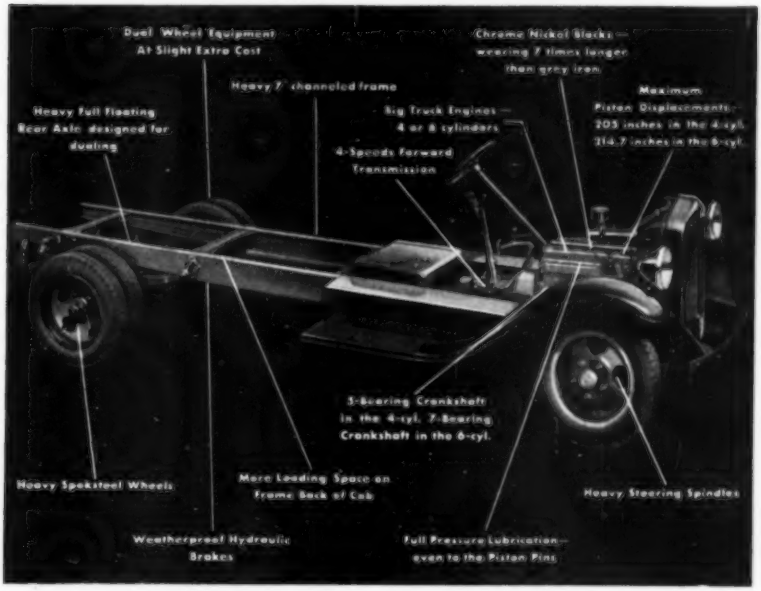
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Heavy Spoksteel Wheels
More Loading Space on Frame Back of Cab
Heavy Steering Spindles
Weatherproof Hydraulic Brakes
Full Pressure Lubrication—even to the Piston Pins

Where maximum strength is not a requisite, commercially pure aluminum, 2S, or the alloys, 3S and 4S, are employed. In these alloys, the increase in mechanical properties depends upon the amount of cold working. They are regularly produced in the annealed condition. "O," in the hard temper, "H," and in three intermediate tempers, designated at one-quarter hard, half-hard, and three-quarters hard. The physical properties of 2S, 3S and 4S are shown in Table 2.

Structural Shapes: The structural shapes used in the construction of aluminum alloy truck and bus bodies are generally rolled from the strong aluminum alloys. These shapes may be formed either hot or cold; however, severe bends requiring excessive hot forming should be avoided by the use of clip angles and gusset plates.

When only minor hot forming operations are necessary, it is usually desirable to apply heat to the piece in the locality of the bend by means of an oxy-acetylene torch with the flame being kept just short of the surface of the metal. Where continuous forming operations are required, as in the case of wheel house angles, it is more economical to use an oil or gas fired furnace to supply the necessary heat. At no time should the aluminum part be heated above 970°F., for above

TABLE 1—TYPICAL MECHANICAL PROPERTIES OF THE STRONG ALUMINUM ALLOYS (1)

Grade and Temper (2)	TENSION (3)			HARDNESS	SHEAR	IMPACT	FATIGUE
	Yield Point (4) Lbs./Sq. In.	Ultimate Strength Lbs./Sq. In.	Elongation Per Cent in 2 In.	Brinnell (Note 5)	Strength (Note 6) Lbs./Sq. In.	Izod Strength (7) Foot-Pounds	Endurance Limit (8) Lbs./Sq. In.
17SO	10,000	26,000	20	45	18,000	8.0	11,000
17ST	35,000	58,000	20	100	35,000	9.5	15,000
17SRT	46,000	63,000	13	..	36,000	....	....
25SO	10,000	26,000	20	45	18,000	8.5	8,000
25SW	25,000	48,000	18	80	30,000	11.0	14,500
25ST	35,000	58,000	20	100	35,000	7.5	15,000
51SO	5,500	16,000	30	28	11,000	10.5	6,000
51SW	20,000	35,000	24	64	23,000	8.0	10,500
51ST	35,000	48,000	14	95	30,000	2.0	10,500

Notes: (1) Young's Modulus of Elasticity is approximately 10,000,000 lbs. per sq. in.

(2) "O" indicates annealed condition; "W," heat treated and quenched; "T," heat treated, quenched and aged; and "RT" cold rolled in "T" condition.

(3) Values for tension are representative of sheet. For heavier sections from which ½ in. diameter test specimens can be machined, elongations run slightly higher.

(4) Yield Point is the stress at which the stress strain curve shows a departure of 0.2% from the initial modulus line produced. The value for compression is practically equivalent to that in tension.

(5) 500 Kilogram load, 10 millimeter ball.

(6) Single shear strength values obtained from double-shear tests.

(7) Olsen-McAdam testing machine of Izod or cantilever type; specimen 10 mm. square with notch having radius of 1 mm.

(8) R. R. Moore type of rotating beam machine; endurance limit based on 500,000,000 cycles.

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TABLE 2—TYPICAL MECHANICAL PROPERTIES OF WROUGHT ALUMINUM AND WROUGHT ALUMINUM ALLOYS (1)

Grade and Temper (2)	TENSION (3)			HARDNESS	SHEAR	IMPACT	FATIGUE
	Yield Point (4) Lbs./Sq. In.	Ultimate Strength Lbs./Sq. In.	Elongation Per Cent. in 2 In.	Brinnell (Note 5)	Strength (Note 6) Lbs./ Sq. In.	Izod Strength (7) Foot-Pounds	Endurance Limit (8) Lbs./ Sq. In.
2SO	4,000	13,000	35	21	9,600	9.0	5,000
2S½H	14,000	17,000	7	32	11,000	10.5	7,000
2SH	21,000	24,000	5	38	13,000	10.0	8,500
3SO	5,000	16,000	30	28	11,000	11.5	7,000
3S½H	17,500	21,000	6	45	14,000	10.0	9,500
3SH	25,000	29,000	4	55	16,000	7.5	10,500
4SO	9,000	26,000	20	40	.....	....	....
4S½H	29,000	33,000	5	60	.....	....	....
4S¾H	33,500	37,000	4	65	....	....	....
4SH	38,000	42,000	3	72	.....	....	....

Notes: (1) Young's Modulus of Elasticity is approximately 10,000,000 lbs. per sq. in.
(2) "O" indicates annealed condition; "H," hard worked.
(3) Values for tension are representative of sheet. For heavier sections from which ½ in. diameter test specimens can be machined, elongations run slightly higher.
(4) Yield Point is the stress at which the stress strain curve shows a departure of 0.2% from the initial modulus line produced. The value for compression is practically equivalent to that in tension.
(5) 500 Kilogram load, 10 millimeter ball.
(6) Single shear strength values obtained from double-shear tests.
(7) Olsen-McAdam testing machine of Izod or cantilever type; specimen 10 mm. square with notch having radius of 1 mm.
(8) R. R. Moore type of rotating beam machine; endurance limit based on 500,000,000 cycles.

this temperature, grain boundary melting (commonly called burning) or complete melting is very likely to occur. To safeguard against this, the furnace should be heated to temperature and the flame shut off prior to placing the aluminum in the furnace.

Heating a strong aluminum alloy structural shape to 450°F. for a short period of time does not materially affect the properties produced by heat-treatment. Temperatures above 450°F. will, of course, increase the workability of the piece but decrease its mechanical properties. At 800°F., the temperature at which most of the more difficult forming operations can be accomplished, there is a loss of 25 to 30 per cent of the tensile strength of the fully heat-treated and aged material. Above this temperature, the effect of heat-treatment is practically destroyed and the properties are substantially the same as for annealed material. In case these properties are not adequate, it will be necessary to reheat-treat and age the piece.

In heating the ferrous metals, it is possible to determine the temperature of the material roughly by the color. Aluminum does not change color as the temperature rises. For this reason, it is necessary to employ a pyrometer. A pine sliver is sometimes used as a makeshift method for determining temperature. When the stick is

stamina!

FACTS ABOUT ONE OF THE ROAD TESTS THAT PROVED THE QUALITY OF MULTIBESTOS L X

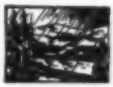
(LATEX BONDED)

Here are some of the facts based on the reports received from part of the 10,000 mile road test made to supplement the Multibestos L X (Latex Bonded) laboratory tests.

SUMMARY OF CONDITIONS AND RESULTS

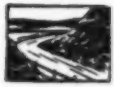
Brake Lining — Multibestos L X (Latex Bonded) regular stock

Weather — Hot — dry — cool — damp — rainy



Automobile — A popular make of light car

Roads — Concrete — macadam — dirt — muddy — rutted



Territory — New Hampshire — over White Mountains

NATURE OF TEST

3100 stops made on mountain grades after acceleration to **45 and 55 m.p.h.**
231 stops in rapid succession or as fast as car would accelerate.
2900 stops made in normal city and rural traffic.
3000 stops on hilly roads—car accelerated to 45 and 55 m.p.h.
9231 stops—total for this portion of the road test.

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Multibestos L X (Latex Bonded) shows a very low wear factor—no swelling—drums entirely free from scoring—no adjustments necessary.

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rubbed across the heated area, it will leave a charred mark after a temperature of 650°F. has been reached. While this method will prevent overheating, it is obviously not as reliable as a pyrometer and should not be employed when maximum physical properties are desired.

The tools normally employed for forming steel structural shapes can be successfully used for aluminum. However, in order to prevent the shapes from becoming scratched and marred, the tools should be kept smoother and cleaner, since aluminum does not have as great a surface hardness as steel. Lubrication with heavy machine oil will, of course, be found to be of advantage in all cases in which machine forming is employed.

Sheet and Plate: Commercially pure aluminum and aluminum alloy sheet and plate can be bent cold. Table 3 lists the bend radii used in average shop practice. Smooth, clean and well lubricated tools should be employed and the axis of the bend should be at right angles to the direction of rolling or the grain of the sheet. Considerably shorter bend radii than those indicated in Table 3, can be employed by taking special precautions. For instance, the tendency for cracking is much less if the corners are

(Please turn to page 28)

TABLE 3

Approximate Radii for 90° Cold Bends
t = Thickness of Sheet

Alloy and Temper	Bend Radii for Various Thicknesses of Sheet		
	up to t = 1/16"	t = 1/16" to 1/8"	t = 1/8" to 3/4"
3 SO	0	0	0
3 S½H	0	t	t
3 SH	t	3t	4t
4 SO	0	0	0
4 S½H	t	3t	5t
4 SH	4t	8t	Note 1
17 SO	0	0	t
17 ST	2t	3t	5t
25 SW	2t	3t	5t
25 ST	2t	4t	6t
51 SW	t	2t	4t
51 ST	3t	6t	Note 1

Note 1: Very difficult to cold bend.

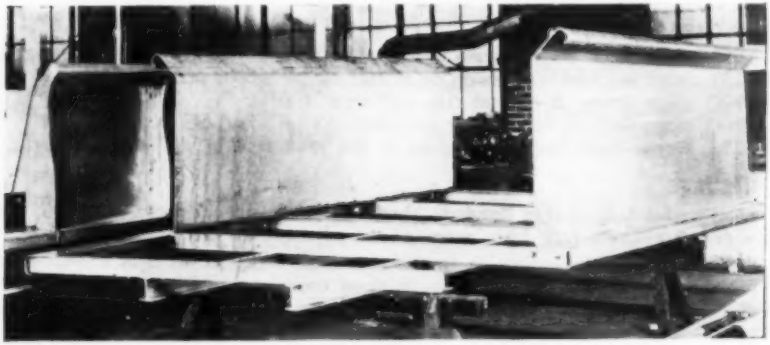

Fig. 1.—Grocery truck body under construction. The longitudinal sills are 4-inch I-beams of 17ST alloy; the cross sills, 3-inch channels of the same alloy; and the side plates 6-gauge 25ST alloy sheet.

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DELUXE performance keeps your trucks and buses on the job—earning profits. And throughout their long life DELUXE PISTONS stay round, prevent oil pumping and assure a cool running motor.

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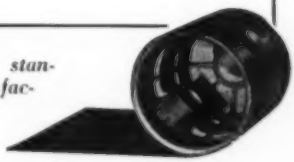

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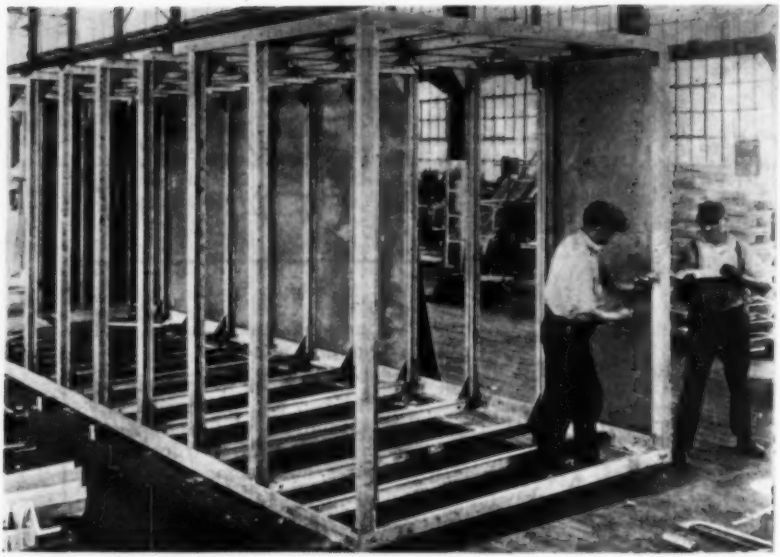

Fig. 2—Heavy-duty van type body under construction. The exceptionally heavy side and roof construction of this body was necessary in view of the fact that the entire load is suspended from the roof. The body was designed for the transportation of frozen meats. Note the clip angles and gusset plates.

rounded at the edges of the sheet near the bend line.

For hot pressing, 17S alloy is generally employed since this alloy age-hardens at room temperature after heat-treatment. The 17S alloy sheet or plate is uniformly heated to 890°-930°F., and at this temperature, quickly placed into the forming tools and pressed to shape. The relatively cold tools produce a quenching effect upon the hot metal, and as a result, physical properties somewhat similar to those obtained by heat-treatment result.

Riveting: In joining the strength members of aluminum structures, riveting should be employed rather than welding since a riveted joint has a greater strength efficiency than a welded joint. Either aluminum or steel rivets may be used. Aluminum rivets are always used when maximum corrosion-resistance and light weight are desired. Steel rivets, however, are quite satisfactory in body work in which these factors are not of prime importance.

Both 3S and 17ST alloy rivets are used. For the low stressed members, 3S alloy rivets are generally employed because rivets in this alloy can be driven cold with comparative ease.

Where maximum strength is essential and it is desired to use an

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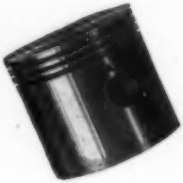

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aluminum rivet, rivets of 17ST alloy are employed. Since this alloy has a shear strength about 25 per cent less than that of steel, there should be a corresponding increase in rivet diameter when rivets of 17ST alloy are used in place of steel.

In sizes up to and including 3/8 inch in diameter, 17ST rivets may be driven cold provided that they are pointed within one hour after they have been heat-treated. If more time elapses, the rivets may become too hard; however, it is possible to retard age-hardening for at least 24 hours by keeping the rivets at a temperature of 32°F. or less after heat treatment. In many cases, it will be found more convenient to heat-treat a day's supply of rivets at one time, and provide a suitable means for retaining them at the low temperature, than to heat-treat a new lot every hour. Rivets which have become too hard to point satisfactorily may be reheat-treated and used within the proper time limit.

The equipment for heat-treating 17S alloy rivets consists of a small electric or gas fired melting pot containing fused sodium nitrate heated to a temperature of 950°F. The rivets are placed in a wire basket and immersed in the bath for about ten minutes after which they are quenched in cold water. Before pointing, any sodium nitrate remaining on the rivets should be washed off.

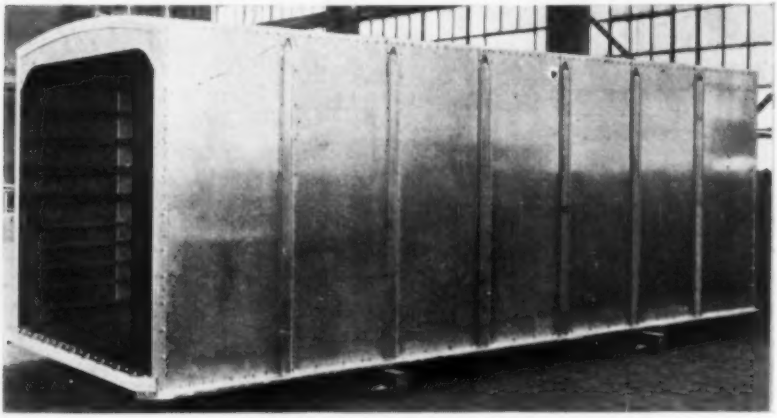

Fig. 3.—Van type body with side posts of pressed sheet. The side posts are die-formed from 51SW sheet, subsequently aged to 51ST. Corner posts are of standard strong aluminum alloy structural angles.

Above 3/8 inch in diameter, 17S alloy rivets are usually hot driven. They should be driven within the heat-treating range of 940°-960°F., the quench being effected by contact with the cold section into which they are driven. Either an electric furnace or a lead bath is most commonly used as a heating medium.

Experience has indicated that the

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easily, quickly. Disc or wire wheels, solid or split rims handled in double quick time. Comes complete with specially designed Hand Tamp, Spring Steel Wedge and Flap Cutter. Order direct and give jobber's name—write.

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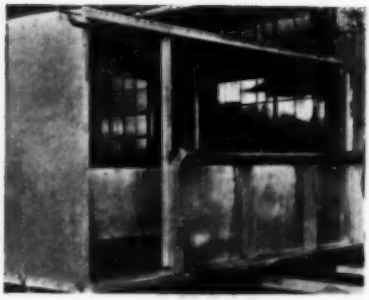

Fig. 4.—Another view of the body shown in Fig. 1. Front-end sheet is 6-gauge 3SH flat sheet; roof sheet is 14-gauge 3SH gray plate supported by Z-bars of 17ST alloy.

compression or squeeze method of riveting is more satisfactory than the hammer method and should be used where possible. Rivets of 17ST alloy above ¾ inch in diameter can, however, be driven by either method. Because aluminum is more susceptible to cold working than steel, a hammer delivering fewer and quicker blows is preferable. The hammer used for pointing 17ST alloy rivets should be capable of pointing steel rivets with a diameter of two to two and one-half times as great as that of the 17ST alloy rivets.

Welding: The usual methods employed for torch and electric-resistance welding can be used for joining parts fabricated from commercially pure aluminum, 3S and 4S alloys. If it is necessary to employ welding in connection with the strong aluminum alloys, it is preferable to use arc welding. With both methods, the material in the welding zone is in the annealed condition and presents a cast structure; however, with arc welding there is a greater localization of the heat. Highly stressed members should not, of course, be welded.

In torch welding, either an oxy-hydrogen or an oxy-acetylene flame can be used. The welding wire generally consists of commercially pure aluminum, 3S alloy or an aluminum-silicon alloy containing 5 per cent silicon. Since aluminum and its alloys are coated with a film of aluminum oxide, a flux should be employed. However, care should be exerted to see that the flux is removed after the weld has been completed. This may be accomplished by soaking the weld in a hot solution of 5 per cent nitric acid or a warm solution of 10 per cent sulphuric acid and then rinsing it thoroughly in hot water.

Sawing: Both band and circular saws are used for cutting aluminum. For the best results, the blades

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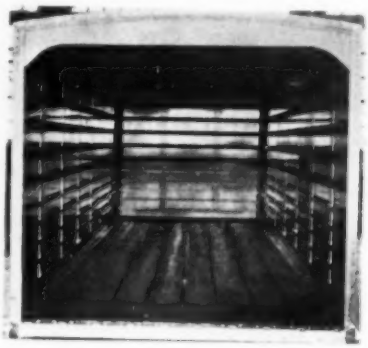

Fig. 5.—Interior of body shown in Fig. 3. Note gusset plates at corners and gusset effect of top plate across rear end. Roof carlines are standard strong aluminum alloy structural angles, formed cold and fastened to top rail by means of clip angles.

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THE K-D MANUFACTURING CO., Lancaster, Penna.

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Chicago Graybar Bldg., New York Philadelphia

WANTED!

¶ On page 35 is a form, ready to be filled out. Maintenance men are urged to cooperate in joining this new form of "club."

¶ In order to become a "member" it is simply necessary to participate in these questions and answers, only when you choose to do so, of course, there is *no* fee, *no* dues, and no limitations.

¶ We would like to see every reader join. See pages 34-35.

The Editor

Bigger loads-fewer drivers

Make yours a heavy duty fleet with Little Giant 6-Wheelers—without adding to operating expense. Only 3 hours to install and 8 holes to drill. Two point frame contact—strong—correct balance and traction. New lower prices. Write today for full information.

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LITTLE GIANT 6-WHEELER

A Few of the Many Answers to Question No. 10

"Tires cost us .009 per mile for a one-ton truck on four tires. We buy tires outright, not on a first-cost basis, but rather on the cost-per-mile when taken out of service. Checks for tire defects are made weekly. All work on tires and tubes is farmed out."—*R. F. Hardin, General Shop Foreman, City Ice Co., Kansas City, Mo., operating a fleet of 256 trucks and 12 passenger cars.*

"We have a tire contract and a vehicle on 30 x 4.50 tires costs us about .008 per mile. All tire repair work is done outside of our shop, of course. We only get from 12,000 to 21,000 miles out of our tires, probably on account of the great number of starts and stops in the dairy business. All the defects listed in your questionnaire are checked frequently and necessary repairs attended to."—*C. Haines, Garage Superintendent, Penn Dairies, Lancaster, Pa., operating a fleet of 45 trucks and 40 passenger cars.*

"Tires for our fleet are purchased outright. We do not keep cost records but we do keep tire mileage records, which average 11,245 miles per tire. The various checks mentioned in your questionnaire are made daily, weekly and monthly, as the case may be. We repair tubes, but do not repair tires in our own shop."—*M. S. Crossley, Foreman, Police Department, Seattle, Wash., operating a fleet of 4 trucks and 52 passenger cars.*

"We purchase tires for our fleet outright and they cost us $212.20 per year per vehicle. Tires are bought on a first-cost basis, consistent with quality, of course. Checks are made for defects daily, weekly and monthly and tires are changed from one side of our trucks to the other side, as often as every month. All tire and tube repair work is farmed out to a tire shop."—*W. H. Jackson, National Refining Co., Memphis, Tenn., operating a fleet of 27 trucks and 2 passenger cars.*

"We have a tire contract, but our tire costs vary considerably, from .0125 and upwards per vehicle per mile. A budget reserve is set up for the purchase of new tires when needed. The various checks mentioned in the questionnaire are attended to at regular periods; when repairs are necessary they are attended to at once. All tire repair work is farmed out."—*Jack Le Sur, Transportation Supt., Arctic Dairy, Kansas City, Mo., operating a fleet of 50 trucks.*

"Do not follow the unit replacement plan, but carry in stock the essential parts of each unit. Our main source of parts supply is from jobbers. Parts which the jobber does not have, we get from the vehicle dealers' service stations. Jobbers generally have bigger stocks, give better service and delivery and their salesmen call regularly. We have too many different makes to carry complete stock of parts or units."—*Geo. Miller, Tacoma Bus and Yellow Cab Company, Tacoma, Wash., operating a fleet of 6 trucks, 24 busses, 6 passenger cars and 12 taxicabs.*

Question No. 11 is Important — Please Cooperate!

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York)

Question-of-the-Month Club

Question No. 11—Oil Changes

On what basis do you change crankcase oil? (Please check below.)

Time Basis? ..... *How Often?* .....

Mileage Basis? ..... *How Many Miles?*.....

Viscosity (body) Basis?.....

When Oil Becomes Dirty?.....

Any Other Basis?.....

What method is used to determine when it is time to change oil, aside from mileage or time basis? .....

.....

If you were sure of the lubricating quality, would you lengthen the period between oil changes? .....

How do you judge what specific kind or grade of oil is suitable for the lubrication of your fleet? .....

.....

In operating engines of the same make, have you noticed a difference in engine temperatures?..... *A difference in oil consumption?*..... *A difference in oil viscosity or body?*.....

To what condition do you attribute such differences?.....

.....

In using or specifying oil, do you consider such engine characteristics as age, make, type of service, mechanical condition, etc.?.....

A booklet is available, giving a practical solution to the problem of testing crank-case oil while the engine is running. Shall we send you a free copy?.....

We operate.....*Trucks;*.....*Busses*.....*Passenger Cars*

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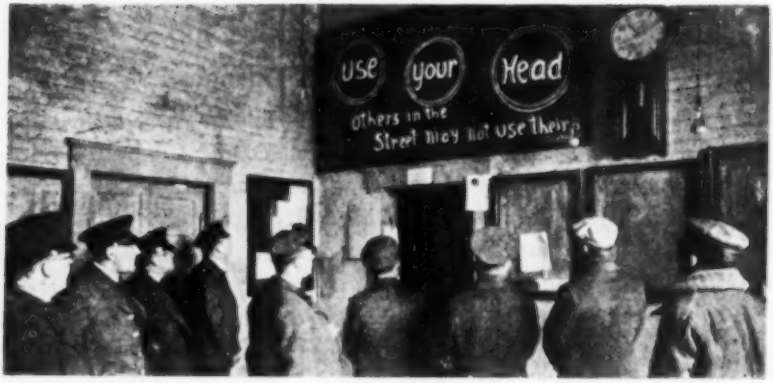
(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York)



Our Driving *is* Improving

Analysis, Covering Three-Year Period, Shows Remarkable Decrease in Truck and Bus Accidents

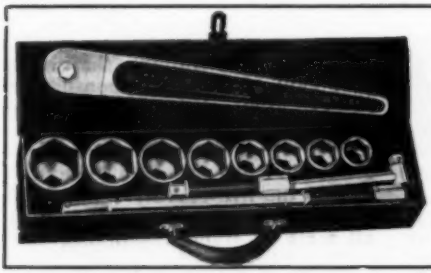
THE average commercial vehicle operator need make no apologies for his driving. There was a time when highly descriptive and somewhat sizzling epithets were hurled at truck drivers and bus and taxi pilots but those days have gone.

There are isolated exceptions, of course, but the rank and file of commercial fleet operators are keeping their eyes on the road, their hands on the steering wheel and their minds on the one all-important task of arriving safely. It is the driver of the private passenger car who is causing most of the annual increase in motor vehicle fatalities. He is the one to watch—and to worry about!

The National Safety Council has just completed an interesting analysis of motor vehicle fatalities covering the three year period of 1927 to 1930.

During this time the number of private passenger cars involved in accident fatalities *increased* 37 per cent. In rather amazing contrast, the number of buses, taxis and trucks involved in fatalities *decreased* an average of 19.3 per cent. More specifically the trucks enjoyed a 14 per cent reduction, the buses a 19 per cent decrease while the taxicabs cut their accident experience down 25 per cent.

This remarkable accomplishment by the commercial fleet drivers not only means the saving of thousands of dollars in compensation claims but best of all it means a clear conscience and new pride in their work on the part of the many "no-accident" drivers that have been developed. They and their companies



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are now reaping the rewards of safety education and safety discipline. They have learned to drive carefully.

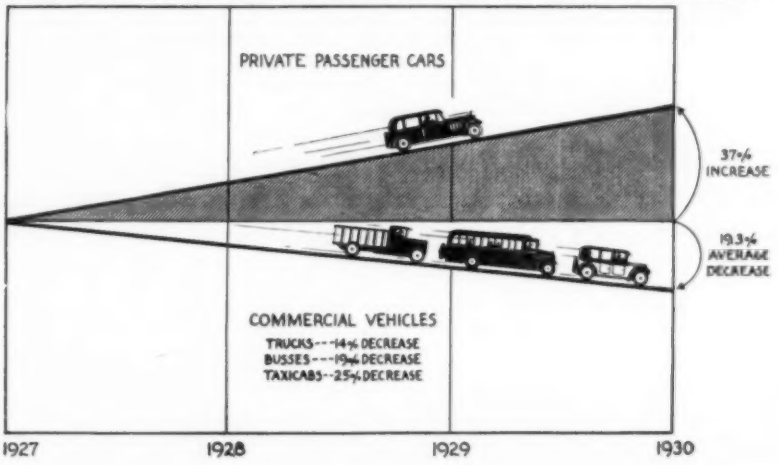
On the sound theory that careful driving among the commercial fleet pilots of the country should receive fitting recognition, the National Safety Council has inaugurated a system of medal awards for one, two and longer yearly periods of no-accident driving. The handsome token is 1⅛ inches wide by 1⅜ deep. The first of these awards has already been made and during the next few weeks hundreds of drivers throughout the country who have completed the period required will be given this official emblem.

Award No. 1 went to a Chicago truck driver, 23 year-old Joseph Papciak, who handled his truck in the densely populated Ghetto district of Chicago where thousands of children spend most of their leisure hours playing about the streets. Papciak drove through the entire year 1930 without even smashing a fender. Four other drivers of the same company, a Chicago water service organization, were also given the emblems. The 1930 mileage of the five operators ran from 12,000 to 40,000 miles each, under all sorts of traffic conditions.

"We should all feel proud of this constant accident reduction by commercial fleet drivers," says W. H. Cameron, Managing Director of the Council. "Their job is not an easy one. They must keep their schedules in spite of gales, blizzards, bad streets and other hardships which send the private driver to cover in a hurry. More than that they must brave the perils of the 'other fellow,' who causes so much grief and suffering—the reckless, irresponsible or incompetent motorist who

(Continued on page 40)

PRIVATE PASSENGER CARS AND COMMERCIAL VEHICLES INVOLVED IN FATAL ACCIDENTS—1927 TO 1930 INCLUSIVE



Experienced Maintenance and Delivery Supervisor Available

A PRACTICAL maintenance man, with over fifteen years' experience in operation and maintenance of motor trucks and buses now seeks a connection with transportation or vocational fleet.

In addition to practical fleet maintenance, have had considerable machine shop experience and technical training. Was previously employed by one firm for twelve years as Superintendent of Transportation.

Desire to connect with concern in vicinity of New York City. Complete details as to ability, previous accomplishments and references available on request or interview.—Address communications to Editor, THE FLEET OWNER, 90 West Street, New York City. All replies will be held in strict confidence.

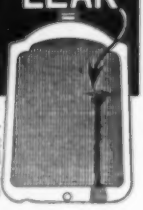
Retail Delivery Convention

THE Fifteenth Annual Convention of the Retail Delivery Association of the National Retail Dry Goods Association was held on May 25th to 28th, at the Wardman Park Hotel, Washington, D. C.

The program stressed economy, control and efficient methods in retail distribution. The members of this Association comprise the larger department stores of this country and Canada, and their representatives attending the Convention consisted of delivery, garage, warehouse and other maintenance executives.

A usual feature of the Convention was the exhibit of motor trucks and equipment.

STOP THAT LEAK WITH SMOOTH-ON No. 1



YOU can apply Smooth-On with radiator full or empty, hot or cold, without removal from the car and without putting anything inside that clogs the circulation.

Merely roll the Smooth-On into a stiff putty, press it against and into the leak with your thumb or pack it into the defect with a knife blade or screw-driver, and scrape off the excess. The leak will stop instantly and the repair is permanent.

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Water jackets of automobiles, stationary or marine gas engines which have developed long or short cracks or have even had pieces broken entirely out from freezing can be made thoroughly and lastingly serviceable by similar repair, or by applying Smooth-On under straps or a plate.

Get Smooth-On No. 1 in 7 oz.; 1-lb. or 5-lb. tins at any hardware store or if necessary direct from us.

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tells how to stop gas leaks from the tank, gasoline lines and exhaust system, oil leaks at gaskets and at cracks in crank or gear case. It also tells how to make headlight posts, nuts, hub caps and belts and grease cups stay tight, etc.

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6-31 .....

(Continued from page 38)
continues to run wild on our highways."

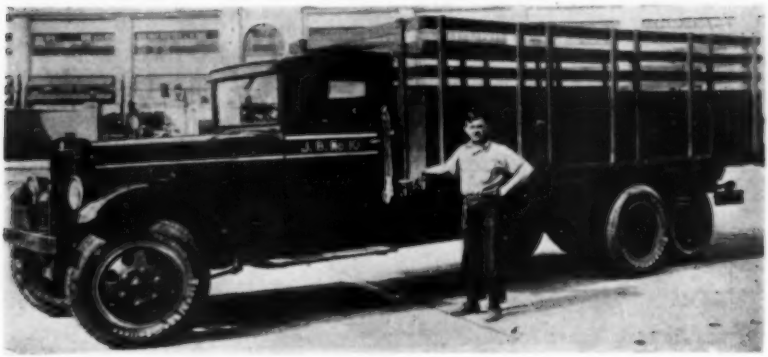
Under the rules laid down by the Council, the drivers of company members all over the country are eligible for the medal, providing their no-accident experience is properly certified by their employers. An accident is defined for this purpose as any mishap in which the driver's vehicle is involved, whether in motion, temporarily stopped, parked or being loaded or unloaded, which results in death, personal injury or property damage, regardless of who was hurt, what property was damaged or who was responsible.

Large and small companies all over the country have been making splendid records during the past year. Twenty-five drivers of the Western Electric Company, Chicago, traveled a total of 185,800 miles with only a broken window to mar an otherwise perfect record. Through an intensive campaign of safety education the Greyhound Bus lines established for their entire system over a period of nine weeks a mark in excess of 60,000 bus miles per accident—more than twice the distance around the world at the equator. Twelve drivers of a so-called small fleet in Detroit have just completed a two-year no-accident period of driving.

Director of Public Safety Division of the Council awarding safety medal to Joseph Papciak, Chicago truck driver who drove throughout 1930 in densely populated Chicago district without any accidents.

This award is given to commercial vehicle operators who drive for one year without accidents. Actual size of medal is 1⅛ by 1½ inches. National Safety Council is the sponsor.

And so the good work continues. The answer of course is that industry—which has made such a fine record in ridding its plants of accidents—is now looking beyond the factory gates and giving the same serious attention to its peculiar safety problems on the highways.



Six-Wheelers *Make Good*

Fleet of High-Speed Units Averages 30 Miles per Hour and a Monthly Mileage of 4,500 per Unit

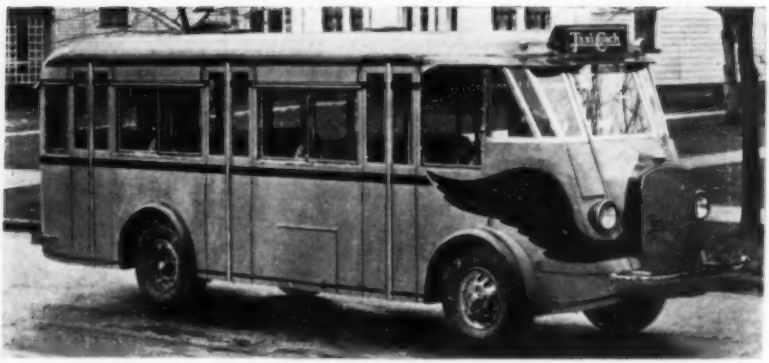
AN inspiring story of the operation of several Reo 3-ton trucks equipped with six-wheel units is told in a letter written to Six Wheels, Inc., of Los Angeles, suppliers of the six wheel equipment, by Judd Brothers, truck transportation contractors of that city. They have several such units, each of which has been operated about 36,000 miles during the past eight months with a total expense for repairs amounting to just one valve grind and one fan belt per truck.

Judd Brothers operate a high-speed truck transportation service from Los Angeles as a base, to Fresno, Phoenix, El Centro and other surrounding cities. The very character of the business, which depends upon speed and dependability, naturally led them to the purchase of equipment which offered both of these advantages.

Their Six-Wheel Reos maintain an average speed of nearly 30 miles per hour on runs up to 1,000 miles, carrying six tons of payload. The average mileage per truck, per month, is 4,500 miles. Tire mileage has been exceptionally high and gas consumption is as low as seven and eight miles to the gallon.

Several typical running schedules are: Los Angeles to Fresno and return (distance 480 miles) in 24 hours; Los Angeles to Phoenix and return (960 miles) in 48 hours.

Judd Brothers have been successful truck operators on the coast for the past nine years with a present fleet of twenty-six Reo trucks; a part of which are equipped with six-wheel units. Six-wheel trucks have been the solution of their transportation problems, increasing greatly the payload of large four wheel trucks.



New!—The Taxi-Coach

New Vehicle is Same Width and Very Little Longer Than Modern Seven-Passenger Automobile

THE Taxi-Coach, just developed by the Twin-Coach Company of Kent, Ohio, is intended for intercity service and has a seating capacity of 17 to 20 passengers. The illustrations accompanying this article will serve to give a general idea of its design. The vehicle is divided into three compartments and has three pneumatic entrance doors, one for each compartment, on the righthand side of the coach.

The Taxi-Coach is the same width, and very little longer than the modern private seven-passenger automobile. By the use of duralumin alloys, the weight can be kept down to 8,000 lbs. or below. According to the makers, the new coach is a "semi-mass transportation vehicle that can be operated at a speed equal to that of a private automobile in any given city, which is approximately 20 miles per hour, overall average, from termini to termini."

The Taxi-Coach is intended to operate under high frequency of headway on given routes, but not necessarily on any given time schedule, the object being to keep the line moving all the time on a basis where on main routes this service should approximate a vehicle always in sight.

Some of the features of this new type of vehicle, as pointed out by the maker are: faster loading; faster unloading; automatic remote fare collection, eliminating fare collection delay; faster acceleration; faster practical deceleration; less delay in moving through traffic.

The fare-collection apparatus is probably most interesting. When the passenger is seated, the fare is deposited in a slot in a stanchion

located in the arm of the seat. There it is electro-pneumatically transferred to a register in the operator's compartment, where in an individual glass receptacle, the operator can inspect it as to amount and designate the seat from which it came. The operator can then dump the fare into the automatic fare box, which counts, segregates and drops the coin into a change-making apparatus, *before* the operator can handle same. Passengers are enabled to secure change, if necessary, by means of a separate transfer tube from operator's compartment to each compartment; also to deliver transfers, tickets, passes, etc., to operator.

A few paragraphs about the mechanical details will be found of interest. A six-cylinder, Hercules engine, with bore and stroke of 4⅛ by 4¼ inches is used, developing 100 h.p. Clutch and transmission are of the standard type, the latter having three speeds. Brakes are of the standard, air-operated type, with gun-metal drums and dual shoes. Single balloon tires are used, front and rear, size 15x9.00 and approximately 33 inches in overall diameter.

The overall length of the vehicle, over bumpers, is 24 feet, three inches. Inside headroom is six feet. Overall width is 70⅛ inches. The wheelbase is 156 inches for the 17-passenger job and 192 inches for the 20-passenger. Weight is approximately 8,000 lbs. Entrance step wells are located inside of the body, 12⅞ inches from the ground; 7 inches deep; 10 inches wide and 22 inches long.

Rear view of the new Taxi-Coach just announced.

The Taxi-Coach is fitted with an electric sign, prominently located on the front end of the coach, which, when all seats are occupied, automatically comes into view with the words "Standing Room Only." In order to hold the weight down to a minimum, there was developed and produced an entirely new type of chassis and body structure, entailing a very liberal use of duralumin. The frame is of the double-drop type.

Three important points are stressed by the makers, which have been responsible for the development of this new departure in motor coaches. They are:

1. The size and weight, combined with the speed of the ultra-modern inter-city bus, have developed a quite antagonistic attitude in the minds of both the general automobile traveling public and the various State, County and Highway Officials.

2. Notwithstanding the fact that the general public is today resenting the size, weight and speed of the large inter-city buses on the highway, the facts are that rates of travel on our highways likely will increase. They probably will continue to go up in direct proportion to the improving and widening of our highways. Today, 60 to 70 miles per hour in a modern automobile and on a modern highway

(Please turn to page 44)

seems neither fast nor dangerous.

3. If bus travel is to hold and increase its present-day popularity, then we feel that a vehicle must be produced and used which will substantially equal the performance and safety of the private modern automobile without seeming to be a usurper on the highways.

If you are interested in obtaining the further, complete details of this new model, which is offered in both City and Inter-City types, an interesting broadside describing it in full can be obtained by addressing The Twin Coach Corporation, Kent, Ohio.

Engine Exchange Offered

A NOTABLE service innovation whereby owners may greatly prolong the life of their trucks through the exchange of engines has been inaugurated by the Diamond T Motor Car Company. The old wornout motor, according to the terms of the plan, is turned in on another power plant, remanufactured and guaranteed by the factory.

Two advantages of the exchange plan are cited by E. A. Haskins, director of service of Diamond T. One is the improved performance secured and the other is the elimination of delays while repairs on the old engine are being made. The transfer of engines requires only a day, whereas repairs may often lay the motor up for three days or more.

"The conditions during the past season have caused truck operators to scrutinize more carefully than ever their cost of operation, and consequently, they have become interested in various features which permit their trucks to be repaired more economically and which prevent their being out of service for any considerable length of time," states Mr. Haskins.

"An unusual amount of interest has been shown in our engine replacement proposition, enabling the owner to secure a factory remanufactured engine, guaranteed to operate like new, in exchange for the worn engine and a certain known amount of money, depending upon the size of the unit.

"This enables the operator in one day's time to get his truck back on the road, with a power plant ready to give him the same long and satisfactory service as he obtained from his original engine. The plan obviates the need of taking the truck out of service for the three to six days which ordinarily would be necessary to recondition completely the original power plant."

Be a Transportation Expert

THE above unusual heading in this publication has been borrowed from the Truck and Bus Tire Department of the Goodrich Rubber Company, Akron, Ohio, who is now offering an especially prepared book full of truck and bus tire facts that you can put to immediate use.

If you read this publication regularly, you are entitled to a free copy of this interesting book. We do not hold that you will learn *all* about modern transportation methods, but we feel certain that, so far as tires go, you will be a well-informed gentleman after reading the above book. The Editor is now arranging to have free copies sent; or you can write directly to the above Company. No obligation, of course, either way.

Keeping It Cold

Semi-Trailer Job Has Self-Contained, Independent, Gasoline-Engined Refrigerating Unit

A HIGHWAY refrigerator car, similar in many respects to the railway cold storage car, recently made its appearance on a Detroit-Chicago provision transportation line.

The car differs from ordinary refrigerated trucks in that it is a trailer, contains an independent refrigeration unit which in no way depends upon the truck engine for motive power, and can be parked at midway stations, even away from power sources, without interruption of refrigeration. The cost of refrigeration, it is said, is extremely low and even the near-zero temperatures needed for ice cream transportation are available.

The highway refrigerator car is operated by Pack's Motor Transport Company, Detroit, and on its maiden run brought twelve tons of meat from Chicago to Detroit under refrigeration that cost the price of two and one-half gallons of gasoline and that did not vary two degrees, Frank Spansky, president of the line, reported.

The refrigeration unit is a new product of Fridigaire Corporation. It incorporates a two-cylinder compressor and a Novo gasoline engine. The compressor is directly connected with the compressor by a 3:1 gear reduction and flexible coupling. Automatic control equipment has been eliminated, and, because of this, it is said, the unit is as sturdy as a concrete mixer, and well fitted to withstand the jars and shocks of truck and trailer travel.

A thermometer, which may be extended to the dashboard of the truck, keeps the driver informed of the temperature in the trailer, or truck. The compressor is operated only when refrigeration is needed and is started by the driver. A magnetic ignition system is used for starting.

Advantages of the new unit, as described by Frigidaire engineers, are sturdy construction, elimination

of delicate automatic control, ability to produce extremely low temperatures without high speed operation of the gasoline engine or compressor, independent motive power and the unit's adaptability for both trailers and trucks.

During the Chicago-Detroit trip, the refrigeration unit was operated about one-third of the time, Mr. Spansky reported, and consumed about two and one-half gallons of gasoline.

Truck Warranty Revised

TO aid in a better interpretation of the warranty on trucks, revisions of the standard form were authorized at the spring meeting of the Motor Truck Committee of the National Automobile Chamber of Commerce in New York, recently.

The new warranty agreement provides that, "hereafter service on motor trucks shall be confined to ninety days after the vehicle is delivered to the original purchaser, or prior to the time when the vehicle has been operated 5000 miles, whichever event shall first occur."

The Committee heard reports from many sections of the country, indicating widespread opposition among manufacturers, farmers, retailers and other shippers to the railroad program to equalize competition between highway and railway transportation, through the passage of laws designed to increase the cost of truck and bus transportation.

A. J. Brosseau, President of Mack Trucks, Inc., as Chairman presided at the full meeting of the Committee. Others in attendance included: T. R. Dahl (White); Paul W Seiler (General Motors Truck); R. G. Hayssen (Sterling); W. C. McAfee (International Harvester); W. S. Graves and J. D. Burke (Dodge Brothers); Robert P. Page, Jr. (Autocar); M. L. Pulcher (Federal). D. C. Fenner (Mack); Edward F. Loomis, Secretary.

Continental's Outlook is Good

SCHEDULES recently received from customers for early deliveries show a healthy increase," states W. R. Angell, President, Continental Motors Corporation. 'Shipments from our plants in April included engines for two well known manufacturers who have recently announced new cars. A distinct trend toward the use of the facilities offered by manufacturers of specialized units, is observed in this new business. The outlook for business during the balance of the year, as reflected by the manufacturing programs of the Corporation's customers, is distinctly encouraging."

Reo Closes Large Order

ONE of the largest orders for automotive equipment to be placed by one firm since the boom days, was closed recently by the Reo Motor Car Company, Lansing, Mich. It involves the sale of hundreds of Reo-Royale passenger car chasses to the National Casket Company, world's largest manufacturers and distributors of caskets and funeral supplies.

Hearse, ambulance and other special bodies for the Reo chasses will be built by the Henney Motor Company of Freeport, Ill., according to H. L. Stein, sales manager of the National Casket Company.

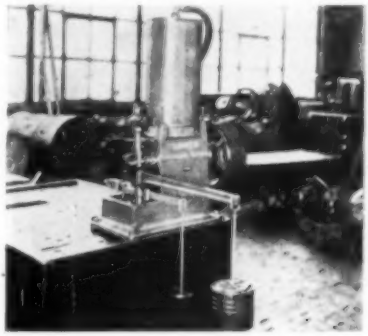
A New Test *for* Lubricants

Apparatus for Testing the Load-Carrying Capacities of Lubricants is Now Available

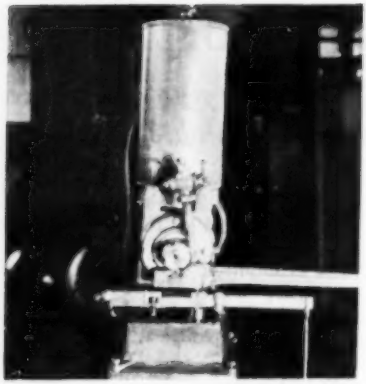
THE Timken Roller Bearing Company, of Canton, Ohio, has just announced an apparatus for testing the load-carrying capacity of lubricants that has some very interesting features. It was originally developed for use in the company's own laboratory as a means for obtaining accurate information on the effect of different lubricants on Hypoid and spiral bevel gears in automotive axles, and to test lubricants in connection with many intricate industrial bearing problems.

The results obtained during the course of these tests were so valuable from a good many standpoints that it was decided to perfect the apparatus and place it on the market. Its usefulness is not confined to laboratory or automotive work; it is equally suitable in industrial plants, fleet maintenance shops, power plants, or anywhere that is desirable or necessary to determine the efficiency of lubricants for given conditions of service. In addition it can be used with equal effectiveness to obtain data on the relative efficiency of different bearing metals under various conditions of load, speed, temperature, or with different lubricants. And, finally, it is so simple that it does not require any particular training or skill to produce accurate results.

The term "simple" applies equally to its construction and to the principle on which it operates. With regard to the former, the apparatus consists essentially of a cast iron base which supports the testing mandrel, two levers and a container holding about a gallon of the lubricant to be tested. In detail, the tank is mounted on top of the base, and just under it is an electric heater, used to raise the oil to any desired temperature up to 210°. The oil flows from the tank, over the test piece, to a sump in the base by gravity, the rate of flow being adjusted by means of a valve in the line. From the sump, the oil is pumped back to the tank by a small pump located in the base, and belt driven from the testing mandrel. The latter extends through the base, and may be either direct or belt driven by a variable speed fractional horse power motor. The mandrel is mounted in two Timken bearings, so arranged as to hold it rigidly in



General view of Timken lubricant testing machine.



Another view of the machine for testing lubricants.

alignment and is tapered at the test end to receive the tapered cup of a Timken bearing. This cup, which forms one of the test pieces is held in place firmly by a nut on the end of the mandrel, which is threaded to receive it.

The lever system, which is the most important part of the device, consists of two levers, one above the other. The upper is called the load lever, and the lower the friction lever, for reasons that will appear. The upper, which carries the test block is pivoted on a knife edge, mounted in the lower lever. The latter is also pivoted on a knife edge and is provided with a stop at the unloaded end. By virtue of this arrangement the test block is always parallel to the revolving cup and the unit loading over the length of both pieces is always constant. The test block is a small piece of metal about ½ inch square by ¾ long, hardened to Rockwell C-60 and ground. It is inserted in a notch in the loading lever and held in place by a wedge. In case bearing metals are to be tested, both the test block or the cup or both can be made of the appropriate material. The friction lever is provided with a vernier scale, and a sliding weight for obtaining accurate measurements and both levers are equipped with hangers for carrying adjustable weights. A welded steel housing is provided to cover the end of the mandrel and levers.

The operation of the device is substantially as follows: Assuming both test pieces in place, the driving motor or line shaft is brought up to the desired speed, and the lubricant heated to the required temperature, is allowed to flow over the test block. The loading lever is then loaded by means of weights until the desired unit pressure is obtained between the test pieces, a chart being furnished with the apparatus which gives the necessary weights on the loading lever per 1,000 pounds of unit pressure.

If only the load-carrying capacity of the oil is to be determined, the test block is removed after 30 minutes running, and examined for signs of scuffing. The degree of scuffing determines the relative load carrying capacity of the lubricant. In case the coefficient of friction of the lubricant is desired, weights are added to the friction lever until it moves away from the stop. Loading the upper lever causes the friction on the test block to move it forward horizontally, unbalancing the friction lever until it rests on the stop. This condition is compensated by adding the weights on the friction lever, until the system is again in balance and the lever is off the stop. The coefficient of friction of the lubricant is then calculated from the amount of weight it

(Please turn to page 52)

Motorcycle *Service* Unit

New Vehicle, Called "Dispatch-Tow" Has Regular Differential—Designed for Quick Road Service

THE introduction of a new vehicle, which permits one man to do the work of two in road servicing and retrieving of automobiles, is announced by the Indian Motorcycle Company, Springfield, Mass. It is a three-wheel motorcycle, of entirely new type, with rear wheel differential and powerful brakes on all three wheels. It has a towing arrangement which, by means of a padded clamp, allows it to be fastened to the rear bumper of a car or truck and towed back to the garage, to the shop, or wherever else desired.

The motorcycle, called Dispatch-Tow, has a box-body as standard equipment, large enough to carry in it ordinary service tools, spare parts and battery. It may be fitted with a carrier for a spare tire and its top will serve as a seat for an extra man if the occasion arises. The differential provides a positive drive on both rear wheels and the operation of the machine is more like that of an automobile than a conventional motorcycle, with the latter's economy in gasoline, oil and tires. The power is the Indian Scout twin-cylinder motor, now in use by many police departments and army units.

The Dispatch-Tow is offered by Indian to reduce the expense, trouble and personnel involved in giving pick-up and delivery service, in rendering quick roadside service and for general utility purposes.

Indian officials also know the expense and time involved by sending two men and one automobile to bring in or deliver the car to be serviced or stored. With the Dispatch-Tow one man does the work formerly required of two. He drives the motorcycle to the car's location, performs whatever service is needed with the tools carried in the box-body, or clamps the Dispatch-Tow onto the car's rear bumper and, in the car or truck, tows it, tracking perfectly, to the destination. The Dispatch-Tow does not require a trained motorcycle driver. Anyone who can drive an automobile can operate it.

Among the services for which

Rear-side view of new motorcycle service vehicle.

the Dispatch-Tow has been designed and on which the Indian Company is now in production are the calling for and delivering cars to women for shopping and other purposes, running errands, performing quick roadside repairs, sending men to automobile factories or central distributing points and return on drive-aways and a number of other purposes. The Dispatch-Tow has a wheel tread of 33 inches and provides space at the rear and on the sides for advertising anouncements.

Another Raybestos Brake School

SO great is the demand for instruction in the Raybestos Brake School maintained by the Raybestos Division of the Raybestos-Manhattan, Inc., at Bridgeport, Conn., that the division, in April, opened another school at Grand River and Sycamore Avenues, Detroit, according to an announcement just received.

Instruction will be given in theoretical and practical brake work under the supervision of competent men, in the same manner as at the parent school at Bridgeport. Admission to the school will be upon recommendation of Raybestos representatives, and it is expected that the school will draw largely from the Middle West, taking in states as far east as West Virginia, west as far as Nebraska and south possibly to Oklahoma, although there will be no restriction as to residence.

In this report the brake school at Bridgeport, during 1930, had men in attendance from many eastern states and from Newfoundland, West Virginia, Ohio, Florida, Chicago and other mid-western cities. During last year 265 men spent a total of nearly 10,000 hours in the school. In January and February of this year 46 men were in attendance nearly 3,000 hours. One week 18 men were registered.

Because of the number who desire to attend the school, it has been necessary to restrict attendance strictly to Raybestos service station men. Instruction is not confined to observation, but the men don overalls and do the actual work, under the direction of brake experts.

New Continental Engines

ANNOUNCEMENT is made of a new series of Continental 6-cylinder L-head engines to be known as the E-600. This group, designed for high speed and performance and of comparatively low weight, does not supplant any of the present lines, but provides a closely graduated series between the Model 16-C and the heavier R-series of the overhead valve type.

All of the E-600 series have a stroke of 4½ inches and bores of 3-11/16, 3⅞, 4⅛ and 4¼ inches respectively. Full provision has been made for all current accessories, such as oil filters, air cleaners, air compressors, etc., and for dual ignition.

Free Wrench Handbook

READERS of this publication are now receiving free copies of the new Husky Handy Wrench Book, offered through the courtesy of Husky Corporation, Kenosha, Wis.

If you have not received your free copy just drop a line to the Editor, who will see that you are promptly supplied without obligation. The book lists and describes many handy service tools. The company's motto is "Tough Tools for Faster Service."

a Midget Model Oil Reclaimer

In Response to Demand, New Skinner Machine Was Designed for Use of Smaller Fleet Owner

FLEET operators for several years through the use of oil reclaiming equipment have fully restored the lubricating qualities of their drainage oil at but a fractional cost of the oil originally. Up to the present time, the purchase price of the larger capacity reclaimers has made the investment of this equipment impractical to the medium size fleet operator.

Skinner Motors have now succeeded in marketing a reclaimer with a capacity of 8 to 8½ gallons of drainage oil daily, at a price within the reach of all. Now operators of small and medium sized fleets through the use of this equipment, may enjoy the same proportionate savings in oil cost and engine maintenance, as is being derived by operators of similar larger equipment.

The simplicity of operation and automatic features incorporated in the Midget Model, illustrated here, require a minimum amount of labor—approximately one-half hour's labor per batch load from start to finish. As no chemicals or other foreign substances are included in the process of reclamation, a skilled attendant is not necessary. Moreover, this feature eliminates the need for close and constant check of the reclaimed oil by a laboratory, or the possibility of removing any of the lubricating qualities of the oil, which it originally contained.

Briefly, the operation is as follows: 8 to 8½ gallons of crankcase drainage is poured into the machine from settling barrel. Heater and fan switches are turned on, and the machine then left alone. About six to eight hours are required to remove the liquid impurities, at which time the machine automatically shuts off. The oil starts to cool slowly, and within the hour, a valve is opened manually, which will permit this oil to flow through a series of filter pads.

However, this oil does not start flowing into the filter pads immediately after the valve just mentioned is opened, but is retained until the oil cools to the proper temperature for best filtration, when a second valve opens auto-

matically. The reclaimed oil filters through a series of three filters, and is collected in storage space in the bottom of the machine, where it may be drawn off for re-use.

Literature is now available describing and pricing this new Midget Model. Interested readers of this publication can obtain free copies entirely without obligation. Address Skinner Motors, Inc., 2231 Dalzelle, Detroit, Mich. The Editor will see that you are promptly supplied if you do not care to correspond with the manufacturer.

Assistant to White President

A. G. BEAN, president of the White Motor Company of Cleveland, Ohio, has recently announced the appointment of Nelson S. Gotshall as assistant to the president. Mr. Gotshall comes to the White Company from New York City, where he was eastern sales manager of the Bishop & Babcock Mfg. Co., of Cleveland. He has wide sales and executive experience in automotive and electrical fields, particularly in handling merchandising campaigns.

Parker Joins Display Service

ONE of the best known figures in the highway transportation field, Carl Parker, until recently head of the Speed Wagon Division of Reo, has become associated with the Truck Display & Service Co., Chicago, Ill., a recently organized concern to deal exclusively in the sales and servicing of Ford trucks, bodies and special equipment. This company occupies the large, two-story building at 2232 S. Wabash Avenue, Chicago, Ill.

B-N Sales Are Good

NET sales of the Burgess-Norton Mfg. Co., Geneva, Ill., for 1930 were only 2 per cent less than in 1929, the biggest year in the history of this company. Sales for the first four months of 1931 compare favorably with 1930, April showing the largest volume since May of last year, according to a recent report.

C. M. Burgess, president, states: "Business conditions are gradually improving and prospects for a big year in the replacement parts industry are excellent."

New Test for Lubricants

(Continued from page 48)

takes to balance the levers.

It would be a simple matter if extreme accuracy in this regard was needed to provide a make or break electric circuit between the lever and the stop that would indicate, by means of a lamp, or some other device, exactly when the correct weight is reached. The same holds true, of course, in case different bearing materials are being tested. Not the least interesting feature of the machine is the permanence of the records it provides. The condition of the test block can be examined at leisure, as a means of analyzing the effectiveness of the lubricant under test.

Should any readers of this publication desire further details regarding this new method of testing, The Timken Roller Bearing Company, of Canton, Ohio, will be glad to send full particulars; or, if you prefer, the Editor will see that your request receives prompt attention.

The Trouble Shooter

A DEPARTMENT devoted to correspondence from readers of THE FLEET OWNER. Any questions having to do with fleet maintenance will be answered. All properly signed inquiries will be replied to by mail and such of them as are believed to be of interest to other readers will be published in these columns.

Address your questions to the Trouble Shooter Editor. We must decline to reply to correspondence not signed with the writer's full name and address.

Grease Leak on Dodge Truck

Question: We have a 1929 Dodge 4-cylinder truck which leaks grease out of the differential, around the drive pinion. This has been packed by other garagemen and we have packed it twice, but it still leaks. Could you suggest some remedy?—H. K., Menomonie, Wis.

Answer: Assuming that your packing has been properly done and everything is in first class shape, it is quite possible that your pinion shaft is slightly bent which causes it to wobble. Under a condition of this kind, you will find it almost impossible to keep it oil-tight, regardless of the packing.

If everything seems to be o. k. the grease leaking out might be caused by the differential housing being filled too full. Check up and see that it is not too high. Some maintenance men often cure stubborn leaks of this kind by drilling a small hole at the top of the axle housing, which permits the housing to breathe. Into this small hole they screw a pipe fitting with a return elbow on it to prevent grease from coming out.

Everyone knows that when the grease in an axle housing gets heated up from constant churning, a certain amount of expansion takes place and this forces out some of the grease the easiest way. The hole and pipe which we suggested will permit air to escape and if located high enough, no grease should come out.

Knock in Light Truck

Question: We have a light G. M. C. truck that is powered with a Pontiac engine. In this engine there is a little knock that can only be heard at low speeds and idling. At higher speeds it can not be heard. It is a kind of a short "tap-like" knock and is not in the valves, as I have checked them. Can you tell me what this might be, before I start tearing down the motor?—A. E. B., Tripp, S. Dak.

Answer: The knock in your engine is either a piston-pin knock, we believe, or else a piston slap, caused by worn pistons, rings and cylinders.

At high speeds it is possibly drowned out by other noises. The writer has just done a job on a Pontiac engine that had a knock exactly like you describe. On taking the job down, we found that there was so much clearance between the pistons and cylinder walls, that it was necessary to rebore and put in new pistons, pins and rings.

If the knock in your car is only a piston-pin knock, this can be easily detected by shorting out the plugs and it can be remedied with an oversize pin, reaming out the rod and piston, of course. If, however, it is difficult to locate, if it comes and goes and is loudest when the motor is cold, we are inclined to believe it is a piston slap. It might be possible to correct your trouble with new rings and pins, without the necessity of reconditioning the cylinders. This depends entirely upon the amount of wear, which is something for you to determine.

More About Oil Pumping

OUR Service Department has recently received a considerable number of requests from fleet repair men for information as to the most effective method of curing oil pumping. The subject is so interesting and important to both the repair man and the fleet owner that we believe the following statement by Fred G. Ferguson, vice president of The Simplex Piston Ring Company of Cleveland, will be generally helpful.

"Oil pumping is a common motor trouble but its exact nature is not always understood, and there is frequently some question as to its exact cause.

"Oil pumping is the passage of oil past the piston rings into the combustion chamber of the motor. Oil is necessary to lubricate the piston as it moves up and down in the cylinder, but once this oil reaches the combustion chamber, it must either be burned or forced out through the exhaust valve in the form of vapor or smoke. Of course, oil does not vaporize as readily as gasoline does, nor does its vapor burn rapidly or completely, as is the case with a good motor fuel.

"The result of having excess oil in the combustion chamber is a slowing up of combustion, which means loss of power, and the depositing of an excess amount of carbon on the spark plugs, valves and cylinder head. It doesn't take very long for this condition to take nearly all the power from the motor. And in addition, oil pumping involves a needless expense by wasting costly oil.

"Oil pumping is caused by improperly fitting pistons and rings, or by worn or out-of-round cylinders. It is found almost as often in new motors as in worn ones. Sometimes the difficulty is hard to trace, because many cylinders expand to an out-of-round condition when hot.

"The cure for oil pumping is the installation of the proper type of oil rings, which bring about a more perfect contact between piston and cylinder wall, and prevent oil from passing into the combustion chamber."

The signs of oil pumping are easy to see. When a car smokes, needs frequent carbon removal, requires constant replenishment of oil, and shows decreasing power, the installation of the proper type of oil rings means a big saving in operating cost for the fleet owner.

Grinding Ford Model A Valves

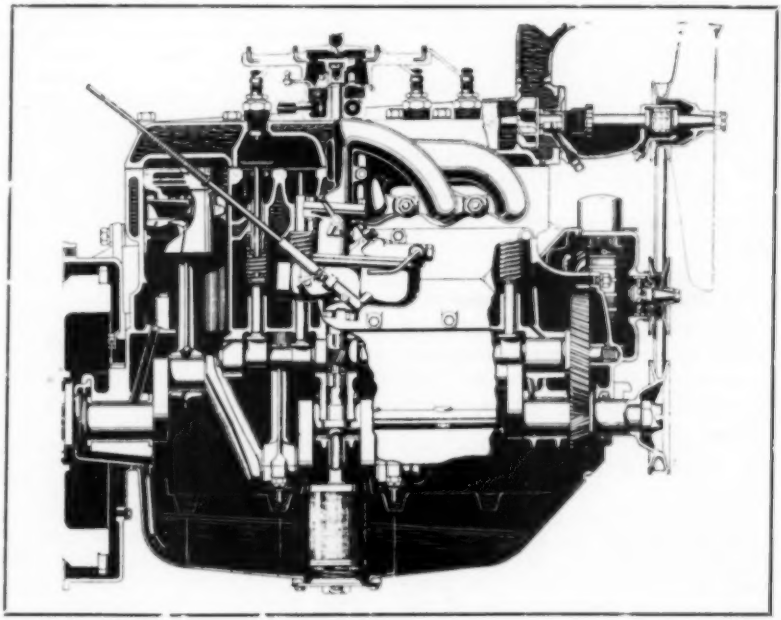
Question: Can you give us any information showing the correct method of grinding and setting the valves on a Model A Ford? How does this procedure differ from the conventional car?—S. H. Co., Toledo, Ohio.

Answer: On this car there is a little more work necessary than on the average L-head motor. The first thing to do is to remove the hood by loosening the support rods at the radiator. The carburetor might next be removed. Next swing the generator in towards the engine and take off the fan belt. The distributor cap and also the complete distributor assembly can next be taken off.

After removing the cylinder head nuts, the head can be lifted off with the fan, water-pump assembly and upper radiator hose.

Now you can remove the bolt from the upper end of the oil-return pipe on the right-hand side of the engine. By loosening the lower bolt it will be possible to swing the pipe down clear of the valve chamber cover, which can be taken off by removing the cap screws. There will be a small loss of oil here, which you can anticipate by placing a pan under the engine to catch it.

Now you will be ready for the valves. Compress the valve springs and remove the retainers, which will in turn permit the valve springs



to be dropped down and removed. You can then take out the valves by raising them as high as they will go, and pushing the split valve guides down until they fall out, using a punch, or a special tool for this job. With the guides out the valves are removed from the top.

When the valves are thus freed, the grinding operation can be done using a vacuum cup tool because there is no slot in the head of the valves. We presume you know all about the grinding operation, so will not outline it here.

After the valves have been reground, you will probably find that there is not enough clearance between the lower ends of the stems and the tappets. The proper clearance should be between .010 in. and .015 in. If there is less than this amount, you can grind off the bottoms of the stems until this clearance is obtained. We do not believe that you will have too much clearance after the valve grinding.

After the proper tappet clearance is assured, reverse the operations and your job is completed. We are printing a cross-sectional drawing of this engine, for your convenience.

A Reader Offers a Remedy

Dear Editor: In reading the April issue of your valuable publication, I came across the article on page 55, where a party was having trouble with a connecting-rod burning out on a Graham Brothers truck, and am suggesting the following remedy:

If this party put new main bearings in this job, he may have put the bottom half up into the upper casting in one or more of the bearings, and in this way one of the rods might not receive any oil, inasmuch as the oil feed on this motor comes down through the upper half of the main bearing, is picked up by the crankshaft and then relayed to the rod next to it.

If he has not touched the mains, his trouble might be caused by the feed line to the upper half of the bearing being clogged with carbon or asphaltum at the base of the bearing. I am offering these suggestions for what they may be worth.—*J. Schultz, 4 Wilson St., Baldwin, N. Y.*

What is Viscosity?

IF you are on the lookout for proven ways to get better performance out of the motor, more power, greater mileage with a minimum of fuel and motor-wear, you are invited to send for a free booklet entitled "A Practical Test for Viscosity."

This booklet is concisely written, with a thorough knowledge of modern lubrication methods, and will be sent to you entirely without obligation. Write to the Visco-Meter Corporation, 318 Grote St., Buffalo, N. Y., or to the Editor of this publication. Your letterhead will insure prompt attention.

Another Free Wall Chart

A NEW wall chart showing safe and unsafe stopping distances at 20 piles per hour for cars with two-wheel and four-wheel brakes is now being distributed free of charge by the Russell Manufacturing Co., Middletown, Conn., to fleet owners and garages throughout the country. The Editor will secure a free copy for you, or, if you prefer, you can write directly to the company.

Continuous Base Rims

TO meet the present-day requirements of the balloon tire and heavy duty service, Firestone Steel Products Company, Akron, Ohio, recently introduced the type "R" rim, which, like other types of Firestone rims for dual mounting, is of the continuous base construction and made in one piece. The locking ring, which is riveted to a continuous side ring, is easily removed and always visible.

This new rim has many entirely new features, yet it is interchangeable on the same wheels with other types, since the standardized 28-degree mounting bevel has not been altered. It has been adopted by many truck and bus manufacturers as standard equipment.

The Firestone Company points out that trucks now equipped with solid tires or single pneumatics can be changed over to Firestone continuous base rims with a standardized 28-degree bevel, by either cutting down the wheel and applying Firestone Universal D-6 bands, or by using new disc or cast wheels. All rims of this new type operate the same, either on a disc or cast type of wheel.

All Firestone rims designed for dual mounting have the standardized 28-degree mounting bevel. Changing operating conditions often make necessary the alteration in wheel spacing. For example: Trucks operating on crowned roads have narrow spacing on the dual tire assembly to secure maximum tire mileage.

The interchangeability of Firestone type "BO," "R," and "DTI" rims on the same wheel alters the spacing so that balloon type equipment may be used in place of high pressure tires without wheel change, or allows for the use of skid chains when the truck is operated on unimproved roads. As another example: A truck may be equipped with 7-inch heavy-duty tires on 7-inch "DTI" rims and changed to the type "R" rim, providing spacing for balloon tires, without any wheel alteration. If trucks should be required in service where skid chains are needed, the "BO" rim may be applied and will provide proper spacing. These combinations, according to the Company, assure increased tire mileage and lower operating costs.

In this connection the new booklet "Changeovers Made Easy" just issued by The Firestone Steel Products Co., Akron, Ohio, will be found of great interest. For your free copy of this helpful little book, write to the Company. If you prefer, the Editor will be glad to see that you get a free copy. Just drop us a line.

New Accurate Warehouse

THE opening of another Accurate warehouse at 244 W. 15th St., Los Angeles, Calif., is just announced by Ira Saks, president. Mr. Saks also advises that his San Francisco warehouse has been moved to 528 Larkin St. A complete stock of the Accurate line of replacement parts will be maintained at both warehouses at all times. These new warehouses, states Mr. Saks, will assure Accurate users on the Pacific Coast a more complete and dependable service.

What YOU New Products of Interest

Free Gasket Sample—Got Yours?

AN interesting offer is being made to the readers of this publication for a limited time, by the Vellumoid Company, 54 Rockdale St., Worcester, Mass., in which they offer free of charge a generous-sized working sample of Vellumoid sheet packing, large enough to test out under actual working conditions.

This packing is suitable for oil, gasoline and water connections and, according to the makers, is tough and durable and will not deteriorate in stock or in use. It can be bent, crushed or treated roughly without suffering any ill effects.

The following advantages have been pointed out by the manufacturer: With a few yards of sheet Vellumoid on hand, gaskets can easily be cut out with a knife or tapped out with a hammer; no shellac is required; ready-cut gaskets made of this material will always fit, as they do not shrink, stretch, crack or break. The material itself is soft enough to fill all irregularities when compressed.

Of course, the best way to know any product is to *use* it, and for this reason we have been able to obtain this offer of free samples for the mutual benefit of our readers and also the manufacturer. For your free sample, write to the Editor, or to the Company at the address given above. Of course, there is no obligation to buy anything, now or at any time.

Free Cable Set Offered

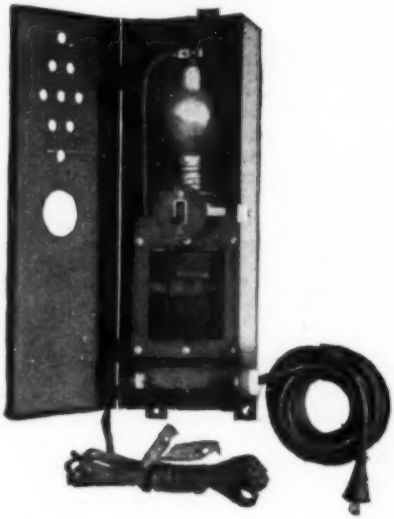
IN order to demonstrate the fact that defective and worn ignition cable hinders starting, steals power and wastes gasoline, the Belden Mfg. Co., 4685 W. Van Buren St., Chicago, Ill., offers to send to any reader of this publication, without obligation, a full sample of high-grade ignition cable for any make of car, bus or truck.

Hundreds of operators are finding out that faulty cables multiply maintenance overhead and delay schedules. If you desire to take advantage of this free offer, the Editor will see that you are promptly supplied with the free sample offered; or if you prefer you can write directly to the Company mentioned above. There is no obligation, either way.

WANT *to* KNOW

One-Battery Tungar Charger

A NOTABLE addition to the line of Tungar battery chargers is the new 6-ampere, one-battery charger just announced by General Electric Company, Merchandise Department, Bridgeport, Conn.



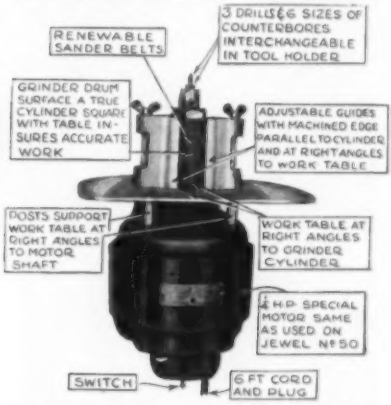
The new charger has many features. Here are some as pointed out by the maker: insulated transformer; all points in casing electrically welded; AC and DC leads of extra length; meets requirements of fire underwriters; designed to operate with 6-ampere Tungar bulb; stationary or portable; easy to install; no wiring necessary; simple to operate; low initial cost; small operating cost; charges overnight without attention.

As with all G. E. products, it is fully guaranteed. List price is $24.00, East of the Rockies.

Combination Brake Machine

THE Jewel No. 51 combination, offered by Raybestos-Manhattan, Inc., Bridgeport, Conn., is a simple, complete and compact machine for brake work. It is a combination drilling, countersinking and brake lining grinding machine.

The illustration is self explanatory. Finished parts are nickel plated. Adjustments are readily made for bands or shoes of various diameters. The grinder sleeve of the new construction insures a straight grinding contact across the

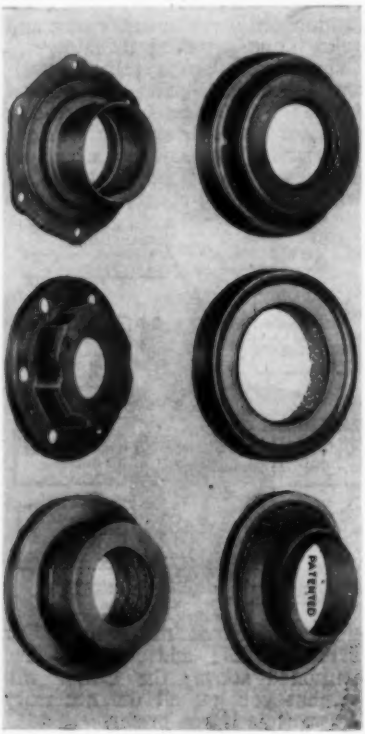

RENEWABLE SANDER BELTS
3 DRILLS & 6 SIZES OF COUNTERBORES INTERCHANGEABLE IN TOOL HOLDER
GRINDER DRUM SURFACE A TRUE CYLINDER SQUARE WITH TABLE INSURES ACCURATE WORK
ADJUSTABLE GUIDES WITH MACHINED EDGE PARALLEL TO CYLINDER AND AT RIGHT ANGLES TO WORK TABLE
POSTS SUPPORT WORK TABLE AT RIGHT ANGLES TO MOTOR SHAFT
WORK TABLE AT RIGHT ANGLES TO GRINDER CYLINDER
¼ H.P. SPECIAL MOTOR SAME AS USED ON JEWEL № 50
SWITCH
6 FT CORD AND PLUG

entire surface of the lining. For further details address the firm mentioned above; the Editor will see that you get all the necessary information, if you prefer.

"National" Grease Retainers

L. A. JOHNSON, vice-president and general manager, announces that National Motor Bearing Co., Inc., manufacturers of National shims, is now producing a line of oil and grease retainers for replacement use on rear wheels, rear axles, front wheels and pinion shafts. The line will be trademarked "National" and will be distributed through jobbers.

It consists of six types and 49 numbers, all duplicates of standard factory equipment. All retainers are made to the same specifications and of the same materials as the original factory retainers.



Whenever brakes are relined, new taper bearings installed, new wheel hubs installed, brake drums resurfaced, new brake drums, gears or axles installed, the corresponding retainers have to be replaced. According to a conservative estimate, all retainers are replaced on every car on an average of at least once each year. Now that jobbers are stocking the line, fleet owners will be enabled to speed up repair work by purchasing retainers along with wheel, axle, brake and gear parts from the jobber on a single order for simultaneous delivery. Waiting for the arrival of retainers, when the truck being repaired is not represented locally, will be a thing of the past.

Inquiries for catalog and other details concerning this new line should be addressed to National Motor Bearing Co., Inc., San Francisco, Calif.

Stewarts Made in Canada

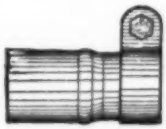
THE Stewart Motor Corporation of Buffalo, New York, announces the organization of the Stewart Truck Corporation of Canada, Limited, with offices and plant located at Fort Erie, Ontario.

"Hundreds of Stewart Trucks are now operating in Canada from Halifax to Vancouver," says E. Hallman, Canadian Sales Manager, "and in order to support our distributor and dealer organization and to give owners Stewart Service the Canadian Corporation was formed."

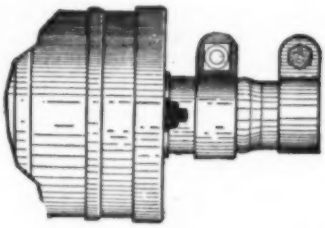
The Plant at Fort Erie has been in operation nearly two weeks and is filling Canadian orders promptly with "Made In Canada Stewarts."

Powell Muffler Nipple Bushing

THE Powell muffler nipple size adjusting or reducing bushing has been developed by the Powell Muffler Co., Utica, N. Y., to make possible a wider use of a given number of their mufflers and thus minimize the quantity of mufflers carried in stock by jobbers.



Reducing Bushing with clamp.



Reducing Bushing assembled in muffler.

The interior arrangement and the dimensions of mufflers as used on many motor cars are so closely alike that there is a great range of interchangeability in this regard. The diameters of the intake and exhaust pipes on the various cars, however, differ to a large extent.

The Powell size adjusting bushing as shown by the accompanying illustration is made so that each end of the bushing is different in size. The variation in size of the bushing combinations is made in ⅛", ¼" and ½" reductions and of various diameters in a range wide enough to generally meet muffler requirements.

The larger illustration shows the method of installing the bushings and also how the head near the shoulder of the bushing determines its correct location, preventing it from being inserted into the muffler to a point which would interfere with the free exhaust of the gases.

These reducing bushings are made to fit both the cup and shell type Powell mufflers. They may also be used in connection with the installation of the Powell hill-climber muffler.

Truck and Bus Tire Hints

TO aid in selecting tire and rim equipment, and to insure satisfactory service throughout the life of same, an interesting book entitled "Truck & Bus Tire Data" has recently been compiled by Firestone Tire & Rubber Co., Akron, Ohio.

As its name implies, this book is chock-full of tire-data in simple language. It was written for the fleet owner and is *not* of a technical nature, but of practical value to the maintenance man. Such subjects as weight distribution, selecting the right size tires, weights of various materials, inflation data, etc., are but a few that are covered in this interesting book.

For your free copy, write to the Editor of this publication, or to the Company mentioned above. A copy will be sent to you at once, without obligation.

Motor Equipment Selection

BEFORE a large audience of members of the Society of Automotive Engineers, recently, Arthur J. Scaife, consulting field engineer of the White Company and a member of the S.A.E. Standards Committee, in discussing the topic, "How to Select Your Motor Equipment," said in part:

"There are no specific data or set values to aid in selecting motor equipment. Therefore consideration should be given to the type of equipment that will best fit into the kind of work to be performed. It is necessary to determine whether the loads to be hauled are heavy or light, for long or short distances and at high or low speeds. A vehicle should be of sufficient size, sturdily constructed so as to give long life, designed to give most efficient operation and of sufficient capacity to carry the load without overloading.

"We believe appearance or style to be of at least equal importance to the ability of the vehicle. With department stores a sale is never complete until the goods have been delivered and accepted by the purchaser, therefore the method of delivery of the goods is a most important factor in completing the sale. This is one of the reasons why the department stores own and control their motor-vehicle equipment, as it gives them complete supervision over the delivery system, the condition of the vehicle and the appearance of the operator.

"We should realize that, to operate efficiently, it is necessary to give the equipment good care in a properly equipped place. It is difficult to get comparative costs that mean anything, as there is no uniform method of keeping records. The Operation and Maintenance Committee of the Society is now trying to devise a plan whereby a uniform system of record keeping will be used so that when comparisons are made they will really mean something.

Methods of Charging Depreciation

"Three principal methods of figuring depreciation which are most frequently used are:

"(1) The fixed-annual-percentage method, by which a fixed percentage of the original delivered cost of the equipment is charged off each year.

"(2) The mileage method, of charging off a fixed rate per mile operated, which is determined by dividing the probable life, expressed in mileage, into the original delivered cost.

"(3) The fixed-percentage-of-remaining-value method, of charging off each year a fixed percentage of the value left from the preceding year."

Must Find True Economic Life

THE third method, said Mr. Scaife, is a refinement of the first and is in many respects a sound one. However, an overwhelming majority of users having low mileages make use of the fixed percentage plan. But when the accountant applies the same arbitrary percentage to all makes of vehicle and on all vehicles of the same make regardless of operation, the result is obviously unsound for cost-keeping purposes.

To meet this objection, a large number of owners advocate that depreciation be charged by the mile. Either method can be used satisfactorily, it is believed, provided that the true economic life of the truck is carefully estimated in terms of both wear and obsolescence or both

mileage and time.

The danger of unsound charging of depreciation lies not so much in the method used, according to the speaker, as in the failure to base the method on the correct economic life of trucks of different quality operating under variable conditions.

A point frequently overlooked, said Mr. Scaife, is the difference between general accounting and cost keeping. Much of the difficulty with depreciation would be eliminated if the truck owner would distinguish between depreciation he prefers to set up for general-account and tax purposes and the depreciation that represents cost and expense figures.

When an arbitrary annual rate is to be used for reduction of truck investment on the general books, a second and accurately estimated rate, either for the year or by the mile and based on probable economic life, must be used for cost-keeping purposes. The maintenance department should supply the correct information to check costs accurately, if it should not actually keep the cost records.

New Gear Catalogs Offered

CATALOGS A and B of the Logan Gear Company, Toledo, Ohio, give complete specifications and other data on flywheel gears and rear axle gears for all cars, trucks and automotive vehicles. These catalogs are free for the asking and may be had by writing to the above company, or to the Editor of this publication.

New Grafild Catalog

A NEW catalog and price list is announced by World Bestos Corporation, Paterson, N. J., makers of Grafild brake lining. This newest publication supersedes the booklet *Brake Lining Facts* which was issued by this company about a year ago, but is now out of print. Copies of the new catalog can be obtained from the Editor, or from the company mentioned above.

Wins Inter-Fleet Safety Trophy

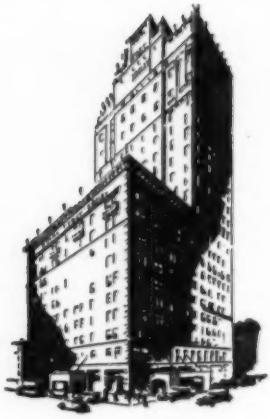
THE Cadillac Motor Car Company has been awarded the Inter-Fleet Safety Trophy of the Detroit Industrial Safety Council, for operating its fleet of trucks without an accident in the City from July 1st to December 31st of last year. This is the second time that Cadillac has won this trophy. As a special incentive to careful driving, this firm offers its drivers desirable awards.

Thompson Offers Master Catalog

FIRST copies of the new Thompson Products master parts catalog have caused much favorable comment by the trade, according to Burke Patterson, replacement sales manager. The catalog features an entirely new idea in grouping and all parts are listed across a single page, in a straight line. Copies now available free, on request to the Editor, or, you may write to Thompson Products, Inc., Cleveland, Ohio.

Sixty Miles With Load

IN case you missed the announcement of Stewart's new eight-cylinder truck that is claimed to do sixty miles per hour with full load, which was described in detail in our April issue, you can obtain the full details at any time. Address Department 52, Stewart Motor Corp., Buffalo, N. Y



A truly Great Hotel

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DETROIT

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Building Aluminum Bodies
(Continued from page 32)

should have coarse teeth with no top rake. The band saws are generally of the high speed metal or heavy duty wood cutting type. A blade speed of 5,000 feet per minute is commonly employed. In the case of circular saws, a peripheral speed of 12,000 feet per minute will give satisfactory results. The usual methods of lubricating the saws are employed when cutting aluminum.

Burning: Burning, as a means of cutting, is not commonly used on aluminum because the heat required will lower the mechanical properties of the metal. Where strength is not a requisite, burning may, of course, be employed.

Shearing: Aluminum alloy plates and shapes may be sheared with the same equipment used for shearing steel. A clear edge will result if the shear blades are sharp and the clearance is about one-eighth the thickness of the material to be sheared.

Punching and Drilling: Rivet holes in aluminum can be drilled, punched or sub-punched and reamed. For the best results, the distance between the rivet holes and the outside edges of the sheets or shapes should be at least twice the diameter of the rivet. When the holes are drilled or sub-punched and reamed, the diameter of the hole is generally 1/32 inch greater than that of the rivet; when the holes are punched, the diameter of the hole is generally 1/16 inch greater. The diameter of the die should be greater than that of the punch by about one-quarter the thickness of the material to be punched. Taper bridge reamers with spiral flutes give very satisfactory results for reaming sub-punched holes to size.

Assembling: In assembling aluminum structures, an aluminum part should not be placed directly in contact with a part fabricated from another metal without some suitable form of insulation to protect both metals from galvanic action. A durable bituminous paint gives satisfactory results when used as an insulating material.

Some woods contain acids, and in the presence of moisture, may corrode the aluminum parts. For this reason, an insulation of bituminous paint or a layer of tar paper should be placed between the wood and aluminum.

Painting: Although aluminum and its alloys do not rust, under certain conditions of exposure, it is desirable to protect them by painting. For ordinary conditions of use, the finishing of an aluminum alloy structure is similar to that of a steel structure except that perhaps fewer coats of paint are required. In preparing the aluminum for painting, the surface should be roughened lightly either by mechanical means, such as by sand blasting or by scratch brushing, or by applying an oxide coating. The surface should, of course, be clean and free from oil before applying the priming coat.

Zinc chromate, red oxide of lead containing about 15 per cent zinc chromate, or aluminum paint with a hard drying spar varnish vehicle are very good priming paints. For the finishing coats, aluminum paint is perhaps the most durable. Where different finishing colors are desired, lead base paint, pyroxylin lacquer or enamel can be used.

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Downdraft Carburetor

NEW in the Ford replacement field is the downdraft carburetor recently placed on the market by the Bendix Stromberg Carburetor Co., South Bend, Ind. This product will fit any model A Ford, and is said to give higher speed, more power, smoother idling and greater economy.

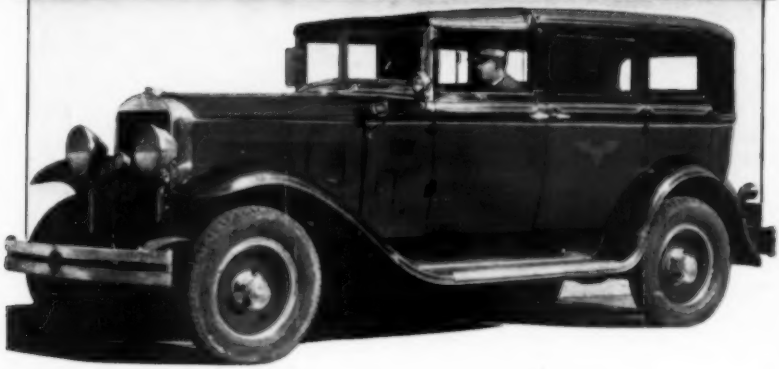
This new downdraft carburetor has efficient fuel distribution and utilizes cooler air because of being mounted on top of the engine. Because of the fuel flowing downward into the manifold with the aid of gravity, the suction is less than needed in the updraft type of carburetor. The air entrance can therefore be larger and permit a greater capacity for this new model.

Following are the functions of the various parts of the new carburetor.

Gasoline is sprayed in a geyser-like stream into the manifold for only an instant by the use of the Stromberg "syringe," which is actuated by depressing the accelerator. The gasoline is then forced from the pump into manifold as the follow-up piston gradually springs up while the throttle is still held open. The result is no gasoline overflows and there is no crankcase dilution. Smoother engine operation is said to result. A separate system provides the smoothest low speed idling possible.

Stromberg engineers have developed an "economizer" device to provide a lean and economical mixture at normal driving speeds and to automatically supply a richer mixture for maximum power at high speed. The automatic choke consists of a small poppet valve on the choke valve which in starting opens when the engine fires, automatically preventing over-choking.

You Can Get 10,000 Miles or More out of Belden Spark Plug Cables



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Horsepower 130.

12 Speed Transmission, 9" Frame, Double Reduction Rear Axle, Worm optional, Booster Brakes, 9.00-20 Balloon Tires, duals rear.

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